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HIGHWAY PROGRESS



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Annual Report of the Bureau of Public Roads

Fiscal Year 1963

U.S. DEPARTMENT OF COMMERCE



The dignity of this one-half-mile long bridge carrying Interstate Route 40 across the French Broad River near Dandridge, Tenn., is in keeping with its scenic setting.



*Annual Report of the
Bureau of Public Roads
Fiscal Year 1963*

HIGHWAY PROGRESS 1963

UNITED STATES DEPARTMENT OF COMMERCE

December 1963

U.S. DEPARTMENT OF COMMERCE

LUTHER H. HODGES, *Secretary*

BUREAU OF PUBLIC ROADS

REX M. WHITTON, *Administrator*

*Acknowledgment is made of the courtesy of the State highway departments
in furnishing the illustrations used in this report.*

CONTENTS

	Page
Summary review of the year.....	1
Development of the Federal-aid program.....	7
New Federal-aid legislation.....	10
The National System of Interstate and Defense Highways.....	12
Status at end of year.....	13
Development of the system.....	14
Progress during the year.....	14
Control of outdoor advertising on the Interstate System.....	15
Interstate System progress: Case histories.....	15
The ABC program: The Federal-aid primary and secondary systems.....	23
Federal-aid improvement of primary highways.....	23
Federal-aid improvement of urban highways.....	24
Secondary or farm-to-market roads.....	24
The highway trust fund and reimbursement planning.....	26
Administration and management.....	27
Organization.....	27
Financial management.....	28
Manpower utilization and training.....	28
Labor compliance manuals.....	29
Audits and investigations.....	29
Audits of States' claims.....	29
Compliance examinations.....	29
Investigations.....	30
Highway and transportation planning.....	30
National planning activities.....	30
Urban planning activities.....	30
Advance planning activities.....	33
Current planning activities.....	33
Route location and right-of-way acquisition.....	35
Relocation assistance and payments.....	35
Use of airspace on highway right-of-way.....	36
Right-of-way practices.....	36
Public utility relocation.....	36
Right-of-way training.....	37
Right-of-way studies.....	37
Highway engineering and design.....	37
Geometric design.....	37
Design standards, policies, and guides.....	38
Pavement and base design.....	39
Bridge design.....	39
Navigational clearance requirements.....	41
Fish and wildlife protection.....	42
Highway esthetics and landscape development.....	42
Use of aerial surveys.....	43

	Page
Highway safety	43
Priority programs	43
Participation in national and regional safety activities	44
National Driver Register Service	45
Research and development	45
National cooperative highway research program	46
Motor-vehicle size and weight study	46
Traffic systems research	47
Economic research	50
Hydraulic research	52
Materials and structural research	53
Developments in electronics	59
Production development	60
Highway improvements under direct supervision of Public Roads	60
Forest highways	61
Accelerated Public Works program	62
National parkways and park and monument roads	63
Bureau of Land Management roads	64
Forest development roads	65
Public lands highways	65
The Great River Road	65
Repair of roads damaged by natural disaster	66
Highway needs of the national defense	66
Emergency planning and mobilization readiness	66
Defense access, replacement, and maneuver roads	67
Foreign activities	68
The Inter-American Highway	68
Other Central American projects	69
The Pan American Highway Congress	70
Other foreign aid activities	70
Foreign study programs	74
Appendix tables list	75

HIGHWAY PROGRESS, 1963

ANNUAL REPORT OF THE BUREAU OF PUBLIC ROADS

Summary Review of the Fiscal Year

PROGRESS CONTINUED during the fiscal year 1963 (July 1, 1962-June 30, 1963) on the vast nationwide highway improvement program launched by the Federal-Aid Highway Act of 1956 and importantly bolstered by subsequent legislation.¹

Federal-aid funds obligated during fiscal year 1963 for surveys and plans, right-of-way acquisition, and construction totaled \$3.927 billion, a sizable increase over the \$3.034 billion obligated in the previous year.

Progress on the 41,000-mile Interstate System continued to be the center of public interest. During the year 2,279 miles of the system were opened to traffic, as compared with 1,725 in the preceding year. At the end of the year 14,829 miles were in use, of which 9,526 miles were completed to standards needed for fully serving traffic in 1975. In addition 5,292 miles were under construction. These controlled-access freeways provided great advantages in lower operating costs, increased safety, and time saving to the motoring public, both private and commercial. Moreover, industrial, commercial, and residential development being attracted to locations adjacent to the Interstate right-of-way contributed to the promotion and development of the nation's economic growth.

In addition to work on the Interstate System, Federal-aid improvements were completed during the year on 17,645 miles of the 846,000 miles of main highways, arterial streets, and secondary roads which comprise the Federal-aid primary and secondary systems (excluding the Interstate System). This so-called Federal-aid ABC program had its modest beginning in 1916, when Federal aid was first extended to the States for rural road improvement.

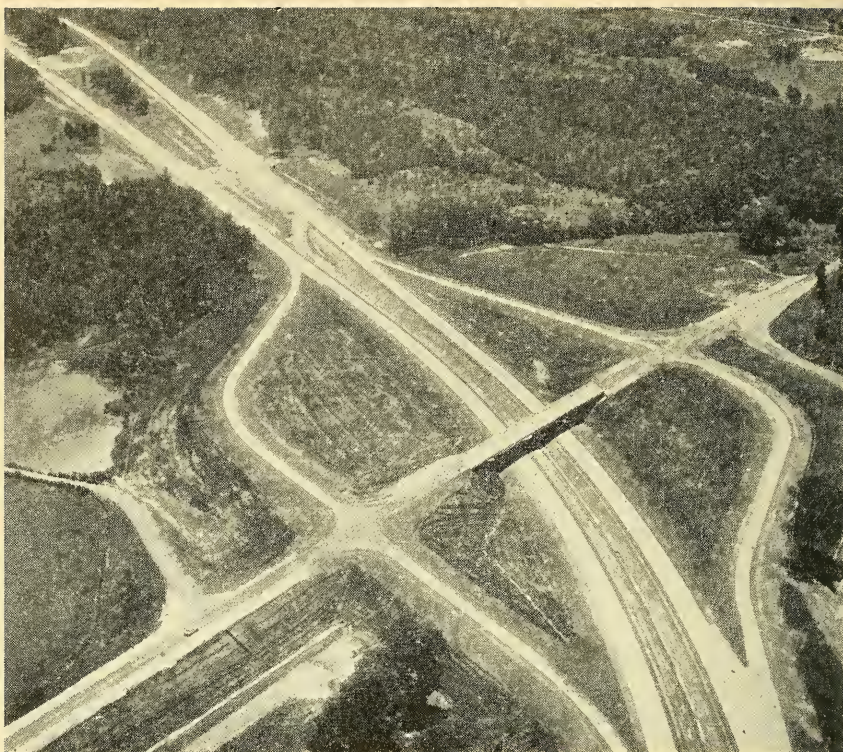
Improvements were also completed under the direct supervision of the Bureau of Public Roads on 1,670 miles of roads in national forests, parks, and parkways and on flood-relief and defense access-road projects.

Highway use

HIGHWAY USE continued to break past records. Motor-vehicle registrations totaled 79.2 million in calendar year 1962 and were expected to reach 82.1 million in 1963, an increase of 3.8 percent. Travel on all roads and streets was estimated at 767.8 billion vehicle-miles in 1962 and was forecast to reach 798 billion in 1963, a gain of 4.1 percent.

Total mileage of all roads and streets in the United States, 3.6 million miles, was no longer growing extensively, but existing mileage was being improved in quality, capacity, and safety.

¹For those unfamiliar with the Federal-aid highway program and its terminology, it is suggested that the next report section, "Development of the Federal-Aid Program," be read first.



Separate roadways fitted into the landscape, as seen beyond the diamond interchange, are typical of design on Interstate Route 59 in Alabama, between Argo and St. Clair Springs. (Not yet in use when photographed.)

Total current expenditures by all levels of government on all roads and streets—for capital outlay, maintenance, highway police, administration, and interest on highway debt—were estimated at \$11.5 billion in the calendar year 1962 and were expected to total \$12.3 billion in 1963. Capital outlay alone—for engineering, right-of-way, and construction—was estimated at \$7.2 billion in calendar year 1962 and \$7.8 billion in 1963. Of these improvement outlays, construction accounted for \$5.6 billion in 1962 and \$6.1 billion in 1963.

Accomplishments of the year

DURING FISCAL YEAR 1963, projects were programed in the Federal-aid and Federal highway programs for the construction of 24,059 miles of improvements. Contracts were awarded during the year for improvements to 22,034 miles of roads and streets. Construction put in place during the year involved \$3.112 billion of Federal funds.

Completions of all classes of Federal-aid and Federal projects during the fiscal year provided improvements on 22,053 miles of roads and streets. Included were 20,383 miles of highways and 5,799 bridges on the Federal-aid systems and 1,670 miles of roads in national forests, parks, and parkways and on flood-relief and access-road projects.

Hazards at railway-highway grade crossings were removed during the year by elimination of 387 grade crossings, reconstruction of 90 inadequate grade-

separation structures, and protection of 326 crossings by installation of flashing lights or other safety devices. These figures include the separation or protection of crossings encountered on new highway locations.

The linear mileage of highway improvements completed is not a full measure of the facilities provided for traffic. Capacity and safety and riding quality are all improved by application of the knowledge gained by experience, observation, research, and development. More and more highways were constructed with better alinement, flatter curves and grades, and smoother and wider pavements. Not only the Interstate but many other Federal-aid projects completed during the year had access control, planned interchanges, and other free-way features.

Many of these projects were built four or more lanes wide, replacing old roads with only two lanes. The 20,383 miles of Federal-aid projects completed during the fiscal year 1963 included 1,755 miles of 4-lane highways and 147 miles having 6 lanes or more. Thus the year's Federal-aid project completions provided the equivalent of 22,433 miles of 2-lane construction.

At the end of the fiscal year, construction was underway or plans had been approved, in the Federal-aid program, for improvements on 32,567 miles of roads and streets. Included were construction of 11,885 bridges and the elimination, reconstruction, or protection of 1,582 railway-highway crossings. The estimated cost of this work was \$11.9 billion, of which \$9.2 billion was Federal aid.

In addition, at the close of the year, the programs for construction of national forest, park, and public lands highways, defense-access roads, and flood-damaged roads and bridges included improvements underway on 3,716 miles, at a total estimated cost of \$200 million including \$187 million of Federal funds.

Accomplishments of the year on the several Federal-aid systems and in the Federal lands highway programs, and detailed information on other subjects, will be found in individual presentations in other sections of this report. Supporting statistics, both in summary and detail, appear in the appendix tables.

New legislation

THE FEDERAL-AID HIGHWAY ACT OF 1962, approved on October 23, 1962, authorized \$950 million for fiscal year 1964 and \$975 million for fiscal year 1965 for the ABC program, plus sizable amounts for the public domain road program. Financing for the Interstate program for fiscal years 1957-71 had been authorized in legislation of prior years.

Significant sections of the act provided for restriction of Federal-aid projects in larger urban areas, after 1965, to those based on a comprehensive, cooperative transportation planning process; for use of Federal-aid secondary funds in urban areas; and for assistance to families and businesses dislocated by the highway program. Provision was also made for expanded use of Federal aid for highway planning and research.

Federal-aid apportionments

APPORTIONMENT WAS MADE to the States during the fiscal year of the \$3.55 billion of Federal-aid funds authorized by the Congress for fiscal year 1964. The total of Federal-aid funds apportioned since passage of the 1956 Act, which launched the accelerated program, was thus brought to \$23.25 billion. Federal-aid funds are apportioned well in advance of the fiscal year for which authorized, to enable the States to plan ahead for the most effective use of these funds.

All of the \$2.6 billion of Interstate funds authorized for fiscal year 1964 was apportioned to the States on September 21, 1962.

An initial apportionment of Federal-aid primary, secondary, and urban (ABC) funds for fiscal year 1964 was made on October 24, 1962, the day following approval of the Federal-Aid Highway Act of 1962 in which Congress au-



Interstate Routes 10 and 17 have relieved acute congestion on Phoenix, Ariz., streets. (Not yet in use when photographed.)

thorized these funds. Because post road mileage (rural delivery and star routes) is one of the elements involved in apportioning ABC funds among the States and final figures were not available in time, only 75 percent of the \$950 million authorized was apportioned on October 24. The remainder was apportioned on November 28, 1962.

Construction contracts and prices

THE FEDERAL-AID PROGRAM of highway construction is accomplished under the traditional American practice of competitive bidding for contracts let by the States. Competitive bidding during the fiscal year was generally quite spirited, averaging 5.2 bids per contract. Successful bidders on Federal-aid contracts averaged 2.4 contract awards each.

During the fiscal year, 7,275 Federal-aid construction contracts were awarded, of which 4,348 were on the primary system and 2,927 on the secondary. (These totals included 823 miscellaneous Federal-aid highway contracts covering such work as demolition of buildings, landscaping, and storm drainage.) The primary system projects included 2,191 on the Interstate System, or 50 percent. Contracts for urban work were also included in the total for the primary system.

The average size contract during the year was \$527,000 and 85 percent of the contracts were for less than \$1 million. A survey made of all Federal-aid contracts awarded in fiscal year 1961 disclosed that 82 percent of the total number of contracts and 54 percent of the total dollar value of the contracts were awarded to small business contractors.

The trend of stabilization in Federal-aid highway construction bid prices, which began in the second quarter of fiscal year 1957, continued throughout fiscal

year 1963. The composite indexes of bid prices (1957-59 calendar year average = 100) for the four quarters of fiscal year 1963 were 98.4, 101.2, 99.6, and 99.6, respectively; and there was a net increase of 2.7 percent during the fiscal year. The composite index for the first quarter of fiscal year 1957 was 100.8; for the last quarter of fiscal year 1962 it was 97.0. These index figures are based on a 1962 revision of the index weighting structure and a change in the base period from 1925-29 to 1957-59 to reflect more accurately the bid price trend in present-day highway construction.

During the fiscal year 1963 the costs of labor and materials amounted to 25 percent and 54 percent, respectively, of the Federal-aid highway construction cost, not including costs of right-of-way and engineering; the remaining 21 percent was charged to equipment ownership, overhead, and profit.

Average hourly earnings of labor on Federal-aid highway construction increased 0.1 percent during fiscal year 1963 but as a result of continually improving productivity in highway construction, the cost of labor decreased 3.2 percent. The cost of highway construction materials dropped 0.5 percent, but equipment ownership costs rose 1.1 percent during the year. The weighted composite decrease of Federal-aid highway construction, labor, materials, and equipment ownership costs was 1.0 percent.

Federal-aid highway construction during fiscal year 1963 utilized some 294 million man-hours of labor, 1.5 million tons of steel, 41 million barrels of cement, 4.5 million tons of bituminous materials, 326 million tons of aggregates, 268 million board feet of lumber, and 478 million gallons of fuel and lubricants for highway construction equipment. Excavation on Federal-aid highway construction amounted to about 1.3 billion cubic yards.

Of the total fiscal year 1963 cost of Federal-aid primary highway construction, exclusive of right-of-way and engineering costs, 29 percent was expended for clearing, grubbing, grading, and drainage, 27 percent for bases and surfaces, 26 percent for structures, and 18 percent for guardrail, fencing, signs, lighting, and other miscellaneous items.

Management

DURING THE YEAR two new primary units were established in Public Roads' headquarters to strengthen controls of the Federal-aid highway program. An Office of Right-of-Way and Location was formed to work in the sensitive fields of route location and right-of-way acquisition. An Office of Audits and Investigations was created with responsibility for audit of State claims for Federal aid, examination of Public Roads activities, and investigation of alleged irregularities.

The former Office of Operations was abolished and its functions merged into the renamed Office of Engineering and Operations. Development activities were added to the renamed Office of Research and Development, which was reorganized into more logical groupings.

Fiscal management continued to be improved. Seven additional States undertook billings for Federal-aid reimbursement under the concurrent audit plan, and 21 States had assumed audit work of railroad and utility claims.

Eighty allegations of irregularities were investigated, and while many of these were groundless, seven persons and organizations were barred from Federal-aid work and 26 cases were referred to the Department of Justice for possible prosecution.

A broad study of needs for management, training, and utilization of manpower was underway, and a study of manpower needs in the right-of-way activity was begun. Reviews of various operations were conducted in five States during the year.



Interstate Route 405, the 8-lane San Diego Freeway in Los Angeles County, Calif., crosses over Sepulveda Boulevard near the massive Mulholland Cut.

Planning, research, and safety

FORESEEING COMPLETION of the Interstate System program in 1972, Public Roads was making tentative plans for a broad study concerning the long-range future scope and direction of the Federal-aid highway program. More immediately, emphasis was being given to urban transportation planning, and comprehensive studies were underway with Public Roads cooperation in 149 of the 216 urban areas covered by the 1962 act.

In research, there was a major shift in program emphasis to foster intensive attack on significant problem areas, prompt application of research findings, and their rapid translation into developed practices.

Safety activities were being further organized and staffed during the year. Pilot programs were started in the areas of improved State traffic accident and driver-licensing records, increased use of traffic engineering, and expanded highway safety training. The National Driver Register Service, in 2 years of operation, had received 325,000 records from the States on drivers who

had lost their licenses for specified causes, and 2 million searches had been made at the States' requests.

Development of the Federal-Aid Program

FOR THOSE UNFAMILIAR with the management of highways in the United States, and the operation of the Federal-aid highway program, this very brief account and the definitions that follow are provided.

To the average highway user, the 3.6 million miles of roads and streets in the United States comprise an integrated network whose purpose is to convey him from his origin to his destination. Officially, this network is composed of a variety of systems. The ownership and responsibility for building, maintaining, and operating roads and streets are divided, roughly according to their relative importance and type of service, among the highway departments of the States, counties, towns and townships, and municipalities.

In some cases the State highway system is relatively small; in some the State administers both a primary and a secondary system; in a few the State controls all or most roads. Many urban freeways and major streets are parts of the State highway systems. Special authorities have been created in some States to build and operate toll roads and toll bridges and tunnels.

State highways almost altogether, and local roads and streets to a considerable extent, are financed from highway-user taxes, principally motor-fuel taxes and vehicle registration fees.

The Federal Government has for many years had a continuing grant-in-aid program to assist the States in highway improvement. The Federal interest stems from provisions in the Constitution to establish post roads, regulate commerce among the States, provide for the national defense, and promote the general welfare. The national interest is in the improvement of highways, and Federal-aid grants may be used only for that purpose. The entire burden of maintenance, administration, and regulation falls upon the States and localities.

While Federal assistance is directly available only to the State highway departments, it benefits local rural and urban governments as well, since many urban streets and secondary roads are on the designated systems eligible for Federal aid.

The Federal-aid highway program is administered by the Bureau of Public Roads, U.S. Department of Commerce. The program is a cooperative one, in which the States choose the systems of routes for development, select and plan the individual projects to be built each year, acquire the necessary right-of-way, and award and supervise the construction contracts. The States pay for the work and claim reimbursement for the Federal share of the cost. The Bureau of Public Roads' function is that of review, approval, and control, in each succeeding step. This process recognizes the paramount rights of the States, which own the roads and must maintain and operate them. Where secondary roads or urban streets are involved, the State highway departments, in using Federal aid, work cooperatively with the local governments.

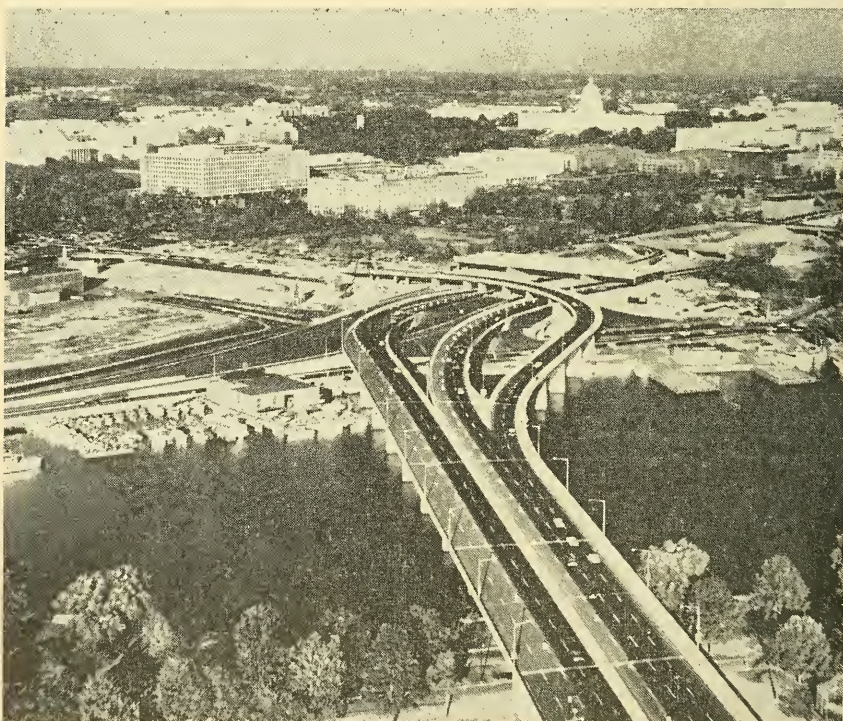
Federal aid to the States for highway improvement had its modest beginning in the Federal-Aid Road Act of 1916. Through the years, without interruption except in World War II, the program has continued to grow in size and importance commensurate with the explosive growth of motor-vehicle transportation in the United States. For almost two decades, use of Federal aid was restricted to rural portions of what now constitutes the Federal-aid primary highway system, an extensive network including most of the country's main-traveled roads. Since 1934 Federal aid has also been extended to the urban portions of

this system, and since 1944 to a Federal-aid secondary highway system of farm-to-market roads.

In 1944 also, the National System of Interstate and Defense Highways was authorized by law. This Interstate System, as it is commonly called, is now limited to 41,000 miles in extent, and constitutes the most important portions of the Federal-aid primary system. Federal-aid funds, however, were not specifically authorized for the Interstate System, or were provided only in relatively modest amounts, until 1956.

The Federal-Aid Highway Act of 1956, augmented by acts of subsequent years, authorized a tremendously enlarged highway program which, in its entirety, is the greatest peacetime construction program in history. The legislation extended at an increasing rate the traditional Federal aid for primary, secondary, and urban highway improvements, and authorized a long-range Federal-aid program for completion of the Interstate System. The 1956 act also established a Federal highway trust fund to receive certain Federal highway-user excise taxes such as the Federal motor-fuel tax, and from which funds for Federal highway aid are disbursed. The Federal-aid program is thus entirely paid for by highway users.

As of December 31, 1962, the Federal-aid primary system totaled 265,489 miles in extent, including the Interstate System. There were 621,189 miles in the Federal-aid secondary system. The urban portions of the primary and secondary systems totaled 43,413 miles.



Interstate Route 95 carries 52,000 vehicles daily into and out of Washington, D.C., not far from the Nation's Capitol. Presently blocked-off lanes will connect with the inner loop, I-295, seen here under construction.

Definitions

Authorization.—Specific amounts of Federal highway aid are “authorized” or made available for each fiscal year by act of Congress, separately for the Interstate System and for the primary and secondary systems. Authorizations for the latter, collectively called the ABC program, by law are distributed 45 percent for projects on either rural or urban sections of the primary system, 30 percent for projects on rural or urban sections of the secondary system, and 25 percent for projects on urban sections of the primary and secondary systems.

Authorizations of Federal aid for the Interstate System total \$37 billion, spread over the 15 fiscal years 1957–71. Authorizations for the ABC program, usually made biennially, have risen from \$825 million for fiscal year 1957 to \$975 million for 1965.

Apportionment.—The total Federal-aid amounts made available for each fiscal year by authorization are “apportioned” or divided among the States according to methods prescribed by law. Authorizations for the ABC program are apportioned among the States according to formulas taking into account population, area, and postal route mileage. Interstate authorizations are apportioned proportionally among the States on the basis of estimates of the cost of work remaining to be done, to enable simultaneous completion of the system in all States. Apportionments are usually made nearly a year in advance of, and remain available for two fiscal years following the fiscal year for which they are authorized. The apportionment is not actual money advanced to a State; it is a credit or notification of the amount available to the State against which it can present claims for reimbursement.

Federal share.—The Federal share of Interstate projects is 90 percent, the States providing 10 percent. For projects in the ABC program the States match the Federal funds 50–50. States with large areas of public lands share in Interstate and ABC project costs on a proportionately reduced scale.

Program.—Following notification of an apportionment, each State highway department prepares a “program” or list of projects on which it intends to use its Federal aid. Approval of this program is an initial commitment of Federal funds. In total there are about 10,000 new Federal-aid projects programed in each fiscal year.

Obligation.—When detailed plans, specifications (or other pertinent information), and cost estimates prepared by the State for a specific project have been approved by Public Roads, the Federal-aid share of the project cost is “obligated” or formally committed and the State may then proceed with the project (either advertising for bids on construction projects or starting work on preliminary engineering or right-of-way acquisition projects).

Improvement.—Federal aid may be used not only for the construction of brand-new roads and bridges but also for the betterment of existing ones by widening and strengthening their surfaces, eliminating steep grades and sharp curves, replacing narrow bridges, etc. It may also be used for preliminary engineering, surveys and design, and acquiring necessary right-of-way. To encompass such diverse operations, the word “improvement” is commonly used.

The complete construction of a section of highway may involve several projects, e.g., one for grading and drainage and another for paving, and the length of each is counted in Federal-aid project data. Thus it must be borne in mind that, unless otherwise evident, mileages reported as programed, underway, or completed are project miles. Duplication of mileage because of two projects on the same site is unlikely in any one year.

Expenditure.—The States initially pay project costs (to a contractor, for example) and then claim reimbursement for the Federal share. Thus Federal-aid

highway funds are actually spent by Public Roads as payments to the States for work already done.

Appropriation.—Federal-aid highway funds are appropriated for each fiscal year by act of Congress, in response to requests made in the budget. The appropriation is the provision of cash to liquidate authorizations already enacted, and is made in an amount considered enough to pay all proper claims made by the States during the fiscal year. The funds are appropriated out of the Highway Trust Fund, already described.

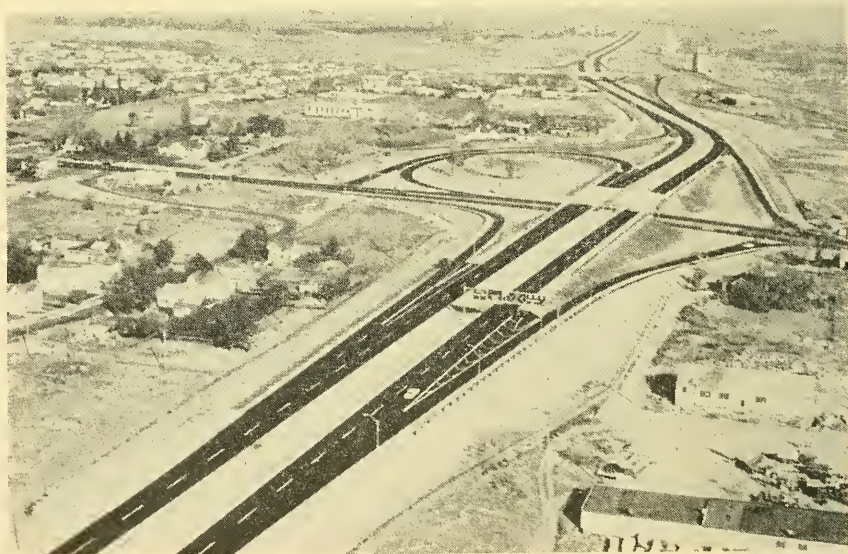
New Federal-Aid Legislation

THE TRADITIONAL BIENNIAL AUTHORIZATIONS for the primary, secondary, and urban (ABC) and public domain road programs were provided in the Federal-Aid Highway Act of 1962, approved on October 23, 1962. For the ABC programs, the law authorized \$950 million for fiscal year 1964 and \$975 million for fiscal 1965.

For the public domain programs, the law authorized \$168.5 million for fiscal year 1964 and \$190 million for 1965, plus \$16 million for fiscal year 1963 in addition to amounts authorized for that year by the 1960 Federal-aid act. Much of these funds, which are for national forest highways and development roads and trails, national parkways and park roads and trails, public lands highways and development roads and trails, and Indian reservation roads, are appropriated to other agencies. (See section on highway improvements under direct supervision of Public Roads.)

The act authorized \$32 million for completion of the Inter-American Highway and made \$12 million of this available for immediate contract. It called for a special study of highway programs and problems in Alaska.

A number of significant provisions of the 1962 act stemmed directly from recommendations in the President's transportation message of April 5, 1962, to the Congress, described in last year's annual report.



Interstate Route 15, here skirting Idaho Falls, is open to traffic for 57 miles north from Pocatello, Idaho.



The Dan Ryan Expressway, Interstate Routes 90 and 94 in the heart of Chicago, Ill., is carrying up to 165,000 vehicles a day on its four multilane roadways. The median has been reserved for rail transit use.

Of great importance to urban areas is the declaration in the act that it is in the national interest to encourage and promote the development of transportation systems embracing various modes of transport in a manner that will serve the States and local communities efficiently and effectively. The Secretary of Commerce is directed by the act to cooperate with the States in the development of long-range highway plans and programs, coordinated with plans for improvements in other affected forms of transportation and formulated with consideration of their probable effect on the future development of urban areas of more than 50,000 population.

Specifically, the act provides that after July 1, 1965, programs of Federal-aid projects in urban areas of 50,000 or more may be approved only if they are based on a continuing, comprehensive transportation planning process carried on cooperatively by the States and local communities.

The act modified prior law so as to permit use of Federal-aid secondary funds in urban areas on extensions of the secondary system which pass through urban areas or connect with primary system routes within the urban areas.

Recognizing the problems involved in the displacements occasioned by highway construction, the act requires that the States provide relocation and advisory

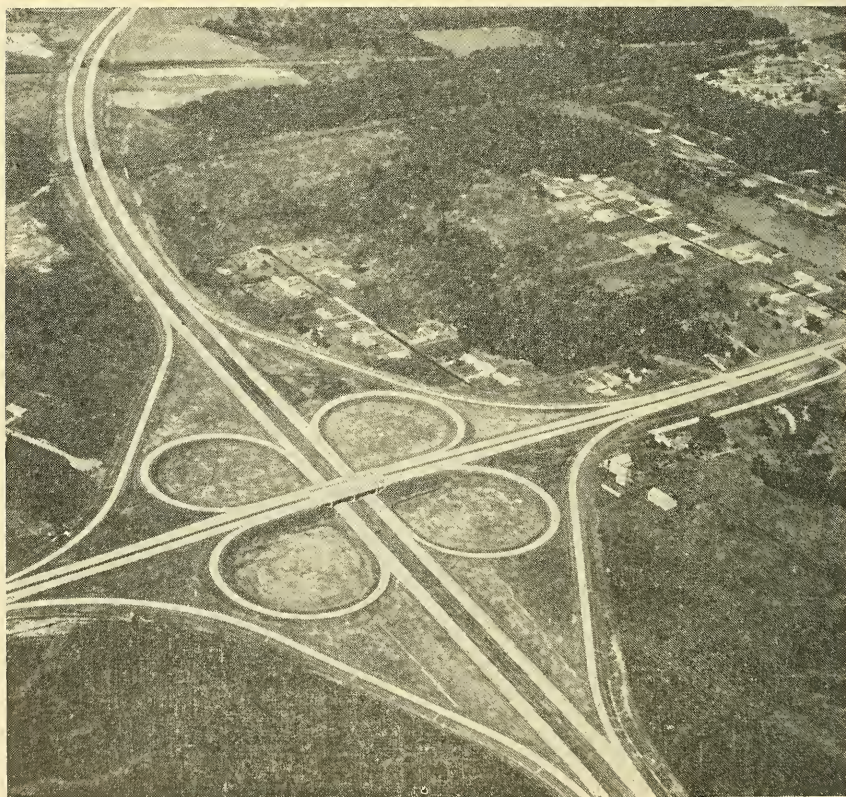
assistance to those who have to move because of Federal-aid highway construction, and provides for Federal participation in moving costs when the State makes such payments. (See section on highway location and right-of-way acquisition.)

For many years the Federal-aid law has permitted the States to use up to 1½ percent of their annual Federal-aid allotments for research and planning studies, rather than for construction. The 1962 act requires that, beginning with fiscal year 1964 funds, the so-called 1½-percent funds must be used for research and planning. Also, an additional one-half percent of ABC (but not Interstate) funds may be used for research and planning if the State so elects. Both categories of funds ordinarily must be appropriately matched with State funds.

The National System of Interstate and Defense Highways

THE INTERSTATE SYSTEM, officially known as the National System of Interstate and Defense Highways, is a 41,000-mile planned, integrated network of the Nation's most heavily traveled routes, linking the country's metropolitan areas and industrial centers, serving the national defense, and connecting with routes of continental importance in Canada and Mexico. Comprising little more than 1 percent of the total U.S. mileage, the system when completed in 1972 will carry over 20 percent of the Nation's traffic.

Controlled access, planned interchanges, separated roadways, and other modern design features make the Interstate routes remarkably safe and at the



Interstate Route 69, here meeting Indiana State Route 14 at a cloverleaf intersection, bypasses Fort Wayne. (Not yet in use when photographed.)

same time permit uniform and reasonably high speed of travel. It has been estimated that when the system is completed it will bring about an annual saving of 8,000 lives that would otherwise have been lost in traffic accidents. In addition, highway users will benefit by \$9 billion in 1973, and increasing annual amounts thereafter, in reduced vehicle operating costs, savings in travel time, reduction in accident costs, and reduction in the strains and discomforts of congested and stop-and-go driving.

Status at end of year

THE CONCENTRATED EFFORTS of the State highway departments, Public Roads, and the contractor, materials, and equipment industries during the 7 years of the Interstate program's existence were reflected in the 14,829 miles of the Interstate System open to traffic at the end of fiscal year.

Of the sections open to use, 9,526 miles were completed to standards adequate for 1975 traffic, the program's objective; and 3,009 miles were improved to full capability for handling current traffic but needed additional improvement to bring them up to the standards for 1975. These accomplishments had been achieved with Federal-aid and other public funds.

In addition, 2,294 miles of toll roads, bridges, and tunnels had been incorporated in the system. Their inclusion is permitted by law, but Federal-aid funds may not be used for their improvement. They continue to operate as toll facilities.

Over two-thirds of the mileage open to traffic, 10,310 miles, had been built or improved under the Federal-aid Interstate program, most of it under the 90-percent Federal, 10-percent State sharing program launched in 1956. Work on the remaining 2,225 miles (other than toll facilities) was financed by the States and localities, mostly before 1956, under other programs—in many cases with Federal aid.

In addition to the sections open to traffic, 5,292 miles were under construction with Federal-aid Interstate funds at the end of the fiscal year, and engineering or right-of-way acquisition was in progress on another 11,308 miles. Thus some form of work was completed or underway on 31,429 miles of the 41,000-mile system—about 77 percent of the total.

The status of improvement of the Interstate System is shown in summary in the table on this page and by States in appendix table 11. A map showing the general location of sections completed or underway appears on pages 54-55.

Status of improvement of the Interstate System as of June 30, 1963

Improvements	Financing with—		Total ³
	Inter-state funds ¹	Other public funds ²	
Improved and open to traffic:	<i>Miles</i>	<i>Miles</i>	<i>Miles</i>
Completed to full or acceptable standards.....	8,924	602	9,526
Improved to standards adequate for present traffic but additional improvement needed to meet full standards.....	1,386	1,623	3,009
Toll facilities.....	---	---	2,294
Total improved and open to traffic.....	10,310	2,225	14,829
Improvements underway with Interstate funds:			
Under construction.....	5,292	---	5,292
Preliminary engineering or right-of-way acquisition underway..	11,308	---	11,308
Total improvements underway.....	16,600	---	16,600
Total completed, improved, or underway.....	---	---	31,429

¹ Including State matching funds. ² Including some Federal aid. ³ Including toll facilities.

Development of the system

THE INTERSTATE SYSTEM was created, with a 40,000-mile limitation, by the Federal-Aid Highway Act of 1944. General locations of 37,700 miles of inter-city routes were officially designated in 1947, and 2,300 miles of routes around, into, and through cities were designated in 1955. Taken into account in the selections, made cooperatively by the States and Public Roads, were the basic factors of population service, transportation requirements of industry, commerce, and agriculture, system intergration, and needs of national defense.

The Federal-Aid Highway Act of 1956 provided a 1,000-mile increase in the limitation of the Interstate System; and about that time it became evident, as the States selected detailed locations for the routes of the originally designated 40,000 miles, that considerable mileage saving had resulted from adoption of alignments more direct than those of existing highways. As a consequence, 2,100 miles of additional routes were designated in 1957 within the 41,000-mile limit.

While the general locations of all Interstate routes have been selected by the States and approved by Public Roads, the States continued to make economic and engineering studies, and to hold public hearings, to determine the most feasible locations for individual Interstate route sections, as a prelude to preparation of final plans and surveys, right-of-way acquisition, and construction.

Until 1956, only limited amounts of Federal-aid funds were specifically authorized by Congress for Interstate System improvement, although Federal-aid primary and urban funds could be and were used to a considerable extent for that purpose. The picture changed radically when the 1956 act authorized almost \$25 billion of Federal-aid funds over the 13-year period 1957-69 for completion of the Interstate System, to be matched on a 90-percent Federal, 10-percent State basis. A much more detailed estimate of the cost of completing the system made in 1958, and confirmed by another detailed estimate in 1961, showed that the total amount of Federal funds needed would be \$37 billion. The Federal-Aid Highway Act of 1961 provided the necessary increased authorizations and revenue.

Federal-aid authorizations for the Interstate System totaling \$13.8 billion, for the fiscal years 1957-63, had been apportioned to the States prior to the fiscal year. The \$2.6 billion of Interstate funds authorized for fiscal year 1964 was apportioned to the States on September 21, 1962.

Progress during the year

THE DETAILS of route selection, making of surveys and plans, acquisition of right-of-way, and construction of projects of the magnitude and complexity involved in the Interstate System often take 3 or 4 years or more from conception to completion. Many route sections are being built in stages, with an initial project for grading and drainage and a subsequent project for paving. Some existing highways are improved and augmented to attain Interstate standards; for example, by acquisition of access control, or by adding another roadway to a 2-lane road, to make a 4-lane divided freeway.

Much was accomplished in the Interstate System program during the fiscal year. The mileage of the System completed to full standards was increased by 2,300 miles, or 6.3 miles per day. The mileage actually in use (fully or partially improved) was increased by 2,279 miles, a growth of 18 percent.

Improvements with Federal-aid Interstate funds were completed during the year on projects involving 2,738 miles of the Interstate System at a total cost of \$1.80 billion, of which \$1.60 billion was the Federal share.

Work completed during the year included 1,951 miles of bituminous and portland cement concrete surfacing, 676 miles of grading, drainage work, and tem-

porary surfacing, and 53 miles of structures involving 514 bridges over streams, 1,363 bridges over highways to provide traffic grade separations, and 110 railway-highway grade-separation structures.

Improvements were programed during the year on 3,724 miles, with an estimated cost of \$3.01 billion including \$2.66 billion of Federal-aid Interstate funds.

At the end of the year a total of \$1.12 billion worth of work was in program status, and 6,828 projects with a total estimated cost of \$8.1 billion were underway or scheduled to start soon.

Excluding projects that have only been programed, a total of \$16.2 billion had been obligated for the Interstate System at the end of the fiscal year, of which 6 percent was for preliminary engineering, 22 percent for right-of-way acquisition, and 72 percent for construction. At the end of the previous year \$13.2 billion had been obligated, of which 71 percent was for construction.

Control of outdoor advertising on the Interstate System

CONGRESS DECLARED in the Federal-Aid Highway Act of 1958 that it is in the public interest to encourage and assist the States in controlling outdoor advertising along the Interstate System. In those States that agree to exercise such control along new locations of the system, outside of certain commercial and industrial zones, the Federal share of the cost of affected Interstate projects is increased by one-half of one percent of their total cost, as a bonus. New Hampshire, New Jersey, Rhode Island, and Virginia entered into such agreements with the Secretary of Commerce during the fiscal year, bringing to 20 the total number of States that have done so. Authority to enter into control agreements expired on June 30, 1963. (Legislation enacted after the close of the year has extended this authority to June 30, 1965.)

Interstate System Progress: Case Histories

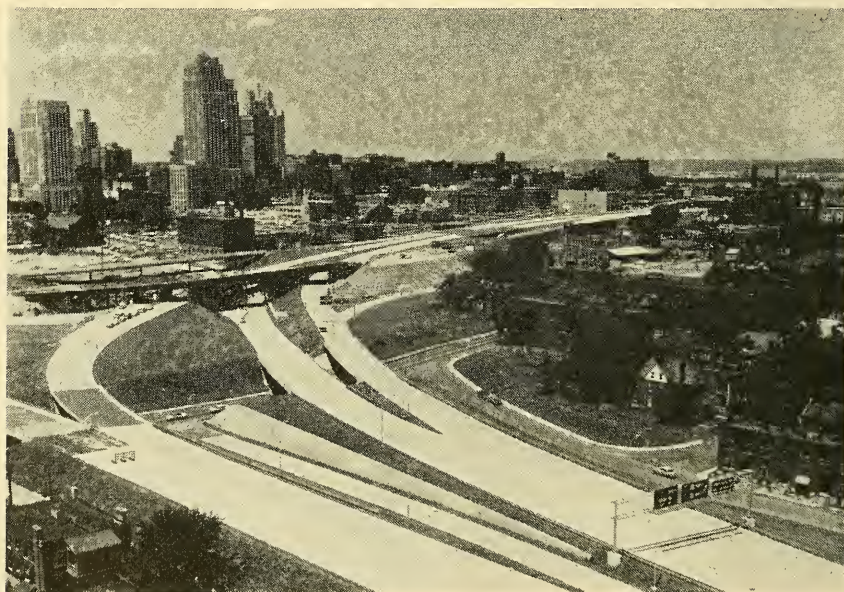
THE PROGRESS in the development of the Interstate System during the 7 years since the accelerated program was launched in 1956 is shown by the statistics in the previous section. Far more impressive to the average motorist or trucker, however, were the many completed sections open to their use, ranging from a few miles to several hundred miles in length. The red-white-and-blue Interstate route marker had become widely recognized as a beacon signaling swift, safe, tension-free driving. Travelers noted, too, the promise of the future in the big construction jobs they saw underway, although sometimes their patience was tried by the necessary detours or delays at construction operations. But the individual driver was apt to know only of Interstate progress in his own locale or along the route of his last business or vacation trip. A close-up picture of progress across the Nation may be gained, perhaps, by glimpses of typical Interstate projects completed or underway during the fiscal year. (I- is used to designate the term Interstate Route, with the appropriate number.)

Alabama.—The 46 mile section of I-65 between Montgomery and Birmingham, opened to traffic in 1961, roughly parallels U.S. 31. In 1958, prior to the freeway opening, U.S. 31 carried 3,500 vehicles a day; by 1962 its traffic had dropped to 2,500 and I-65 was carrying 4,000. In 1960 there were 70 accidents on U.S. 31; in 1962 there were only 41 accidents on both U.S. 31 and I-65.

Arizona.—A 6-mile, 6-lane section of the Phoenix Freeway, part of I-10 and I-17, was opened to traffic during the year, adding to a 6-mile section previously completed. The freeway, already carrying as much as 33,000 vehicles a day, had relieved heavy congestion on Grand Avenue and cut driving time to the airport by 20 minutes.



Interstate Route 70 links the two Kansas Cities, crossing the Kansas River (above) on the old and new Intercity Viaducts. (The new structure was carrying all traffic while the old one was being re-decked.) The Kansas City, Mo., central business district, looming in the distance above, is shown close up below, served by the Innerloop section of I-70. (Construction was under-way at the time of this photograph.)



Arkansas.—A 7-mile section of I-40 bypassing West Memphis was completed and opened to traffic, greatly relieving congestion on U.S. 70 and affording considerable time saving to traffic crossing the Mississippi River.

California.—A 5.6-mile section of I-405, the San Diego Freeway in Los Angeles county, was completed during the year. The \$20 million project through the Santa Monica Mountain required what is possibly the biggest highway excavation job in the world, one-fourth mile wide and 250 feet deep, at Mulholland Cut. Some 14 million cubic yards of rock and dirt were moved. Six months after its opening, I-405 was carrying 93,000 vehicles daily; the old route, Sepulveda Boulevard, had dropped from a badly congested 40,000 vehicles a day to 4,000. The new freeway cuts 7 minutes off the trip across the mountain, saving \$6.9 million in travel time a year.

Colorado.—In Denver, I-70 was under construction as a 6-lane divided freeway on a viaduct structure. East 46th Avenue, beneath the viaduct, was being rebuilt as a 4-lane divided street with a 19-foot center median.

Connecticut.—Work began during the year on a four-span, 6-lane 512-foot bridge which will carry I-91 across the Quinnipiac River in New Haven. The \$2.3 million bridge project included excavating 75,000 cubic yards of unstable tideland marsh muck 18 feet deep, and hauling in 235,400 cubic yards of rock and dirt for the bridge approaches. The bridge will require 3,000 tons of steel, 34,000 lineal feet of cast-in-place piles, and 8,000 cubic yards of concrete.

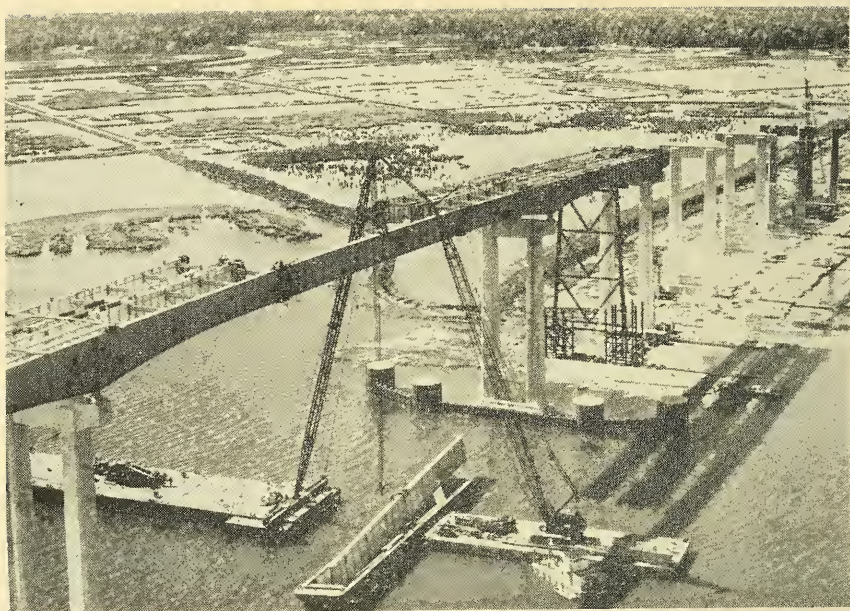
District of Columbia.—Extending northward from connections with the twin Potomac River bridges completed in 1950 and 1962, a new 8-lane structure carrying I-95 over the Washington Channel was opened to traffic during the year. The quarter-mile long, \$7½ million steel girder bridge separates into three forks on the Washington shore, connecting with city streets and the inner loop, I-295, now under construction. The new bridge was already carrying 52,000 vehicles daily.

Florida.—A 23-mile section of I-10, costing \$6.2 million, was completed during the year between Lake City and Sanderson. I-10 was open to traffic from Lake City to Jacksonville, a distance of 62 miles.

Georgia.—From Atlanta to Suwanee, a distance of 30 miles, I-85 was completed and open to traffic. Construction was underway on the remaining 70 miles to the South Carolina State line, with completion expected in 1965. This portion of I-85 follows the general location of the "National Highway," improved and marked 50 years ago under the sponsorship of Atlanta and New York civic groups.

Idaho.—During the year a 57-mile section of I-15 from Pocatello to a point 9 miles north of Idaho Falls was completed, at an average cost of \$376,000 per mile. The route, involving 70 major structures, including an 804-foot bridge over the Snake River, traverses a mixture of desert, lava beds, and irrigated farm land. Congestion on the old highway has already been relieved. Trip time on this section of I-15 is 50 minutes as against more than 2 hours on the old route, and I-15 is 2½ miles shorter.

Illinois.—An 8½-mile section of Chicago's Dan Ryan Expressway, a vital link in I-90 and I-94, was opened during the year, bringing into use the 12-mile freeway from the junction of I-90, the Congress Street Expressway, and I-94, the Northwest Expressway, in the heart of downtown Chicago, south to a major fork where I-90 veers east and I-57 comes in from the south. A junction with the Chicago Skyway provides connection to the toll roads leading to the eastern seaboard. Total cost of the 12-mile freeway was \$200 million. A portion of the Expressway has two 4-lane roadways for through traffic, flanked on each side by a 3-lane collector-distributor roadway. The freeway was carrying up to 165,000



The Calcasieu River ship channel bridge which will carry Interstate Route 210 bypassing Lake Charles, La., is the longest and heaviest structure of its type in the U.S. Here one of four 181-foot, 130-ton girders is being hoisted 135 feet into place.

vehicles a day, while traffic on nearby Lake Shore Drive had dropped from 90,000 to 50,000.

Indiana.—Some 75 miles of I-65 were put into use during the year with the opening of a 26-mile section from U.S. 31 at Taylorsville to Seymour. The portion from Seymour to Louisville, Ky., had been open for 2 years. The new 26-mile section, costing \$16.6 million, includes 27 structures: 4 interchanges, 13 highway and 1 railroad grade separations, and 9 river crossings.

Iowa.—Of the 158 miles of I-80 from Des Moines to Davenport, 85 miles were open to traffic and all but one mile of the remainder was under contract, with completion scheduled in 1964. Studies indicated that travel time between the two cities will be reduced from $3\frac{1}{2}$ to $2\frac{3}{4}$ hours, and road-user savings for each vehicle trip will be more than \$3.

Kansas-Missouri.—The Intercity Viaduct, which has carried traffic between the two Kansas Cities for years, was being rehabilitated to carry eastbound traffic of I-70. A new structure adjacent to the old viaduct across the Kansas River was completed during the year and was carrying all traffic while the old viaduct was being re-decked. Upon completion of the work, each viaduct will carry three lanes of one-way traffic. Current traffic was about 45,000 vehicles per day.

Kentucky.—A $4\frac{1}{2}$ -mile section of I-64 near Frankfort, completed during the year, extended a 21-mile section opened earlier, which with U.S. 60 provided a 4-lane divided highway from Louisville to Lexington. The old route, U.S. 60, formerly carried 12,000 vehicles a day through Frankfort, but this had dropped to 7,700, and I-64 was carrying 5,200 vehicles daily, including most of the trucks. In 1962 there were 135 accidents on the old route, including runaway trucks on the steep grades. During the first 6 months after I-64 was opened, there

were only 20 accidents on the old route and 6 on the new. I-64 was also affording a time saving of 20 minutes.

Louisiana.—The \$7.8 million Calcasieu River ship channel bridge, part of I-210 bypassing Lake Charles, was nearing completion. The continuous three-span 950-foot bridge, with two 28-foot roadways, has a 450-foot center span 135 feet above water. This is the longest and heaviest single-web welded plate-girder bridge in the U.S.

Maine.—Completion during the year of a 2.4-mile section of I-95 opened up a 26-mile, 4-lane divided highway from Portland to Brunswick. A part of the route required further work to meet full Interstate standards.

Maryland.—During the year the Cabin John Bridge was completed and opened to traffic, carrying I-495, the Capital Beltway, across the Potomac River a few miles upstream from Washington, D.C. The Beltway is Washington's circumferential freeway. An interesting design aspect was that bidders were offered three alternate types of construction: all steel, prestressed concrete, and a combination of the two. The winning bid was for steel construction.

Massachusetts.—An unusual bridge was being built to carry I-495 over the Merrimack River from North Andover to Lawrence. The \$4 million multiple-span steel girder structure has two decks: the upper level provides two roadways, each with two 12-foot lanes and shoulders, for through Interstate traffic; the lower level, with similar cross section, will serve local traffic.

Michigan.—During the year a 51-mile stretch of I-96 between Lansing and Brighton was completed, opening to traffic a continuous 170-mile freeway from Detroit to Muskegon via I-96 and I-196. Travel time between the two cities was reduced from 5 to 3 hours. The new section of I-96 included the 1,000th mile of freeway completed in Michigan. The State's freeways, compared to the roads they replaced, had reduced accidents 67 percent, injuries 64 percent, and deaths 76 percent.



Interstate Route 80N travels rough country along the Columbia River near Cascade Locks, Oreg. A narrow median with safety guard rail was used, since a broad median would have been too costly.

Minnesota.—On the south side of Minneapolis, the serious traffic bottleneck along 3-lane State Route 100 was relieved by completion of 9½ miles of I-494, which is part of a projected freeway circumferential around Minneapolis and St. Paul. The completed section, which cost over \$13 million, was carrying up to 42,500 vehicles per day, four times greater than traffic of 10 years ago on old Route 100. Extensive commercial growth was spreading along the new freeway.

Mississippi.—A 48½-mile segment of I-55 from Batesville north to the Tennessee State line near Memphis was opened to traffic during the year. Location studies on this \$30 million segment began in August 1956, and construction involved 22 contracts and included structures for 8 interchanges, 17 grade separations, and 11 stream crossings—one of them 2,000 feet long. In the 5 months preceding the opening of the freeway there were 92 accidents and 3 deaths on the old road, U.S. 51; in the 5 months following the opening there were only 19 accidents and 1 death on U.S. 51 and 4 accidents (no deaths) on I-55.

Missouri.—During the year a 5-mile section of I-70 was completed in Kansas City. Known as the Southeast Freeway, it extends from the downtown Innerloop easterly toward Independence and was already carrying up to 40,000 vehicles daily. The 6- and 8-lane projects cost \$41 million, took 4½ years to build, and involved acquisition of 1,450 parcels of land. Trips on the Innerloop and Southeast Freeway, both part of the Kansas City expressway plan approved in 1951, take about 10 minutes, as compared to 30 minutes via city streets.

Montana.—Twenty miles of I-94 completed during the year, bypassing Miles City, connected with a section completed previously and opened a 34-mile stretch to traffic. The 2-lane freeway was carrying nearly 1,800 vehicles a day, easing the traffic movement in the central business district of Miles City.

Nebraska.—Seventy miles of I-80 were open to traffic from Omaha to west of Lincoln. The benefit of I-80 within Omaha was evidenced by a drastic reduction in serious-injury accidents on city streets. Traffic on Omaha's main east-west streets had dropped 20 percent.

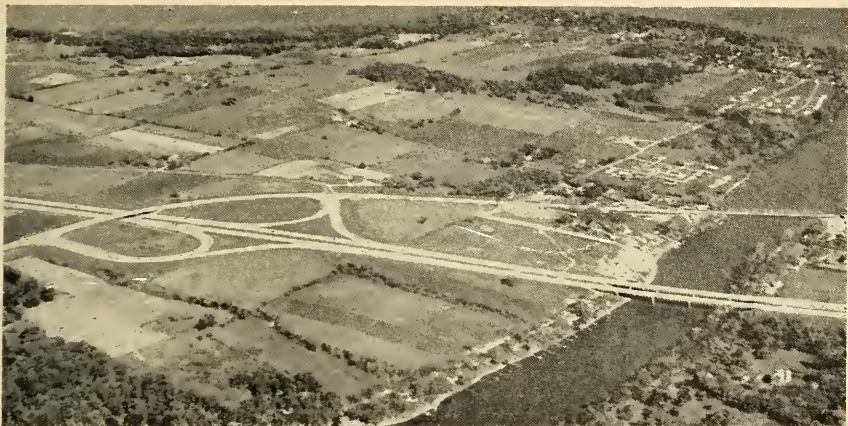
Nevada.—Completion of a 10-mile project during the year opened 36 miles of I-15 to traffic from the California State line to 5 miles south of Las Vegas. Completion of another project put 22 miles of I-15 into service northeast of Las Vegas.

New Hampshire.—During the year 12 miles of I-93 were completed between Manchester and Salem, bringing to 70 miles the sections of this route open to traffic in the State. The independent roadway design took full scenic advantage of rolling terrain, woodland, and rock ledges. The remaining 5 miles of I-93 between Salem and Manchester were under construction.

New Jersey.—Work was underway on I-95 between the New Jersey Turnpike and the George Washington Bridge over the Hudson River. One 1.2 mile project costing \$8½ million will provide a 10-lane dual-dual freeway (pairs of through and outer roadways) and a high steel-arch overpass. Involved were the excavation, crushing and moving 1½ miles by conveyor belt of 1.2 million cubic yards of rock.

New Mexico.—With completion of a 1-mile project during the year, 7 miles of I-40 were open to traffic in northeast Albuquerque. An unusual feature of this urban freeway is a paved median channel and a hydraulic energy dissipator to take care of heavy rainfall runoffs from the Embudo drainage area.

New York.—A 1.7-mile section of I-95 in New York City, the Trans-Manhattan Expressway and part of the Cross Bronx Expressway, was opened to traffic during the year. The \$39 million construction project, connecting the George



Interstate Route 90 crosses the Rock River on twin bridges and intersects State Route 59 near Edgerton, Wis., on its way from Chicago to Wisconsin Dells.

Washington Bridge over the Hudson River with expressways on Long Island and into New England, included building a depressed freeway with 12 lanes in four separate roadways across Manhattan Island, and an 8-lane, 1,526-foot steel arch bridge over the Harlem River. Traffic on the new facility had reached 60,000 vehicles per day, and trips across Manhattan and the Bronx were being made in minutes instead of hours. Spectacular use of airspace over I-95 in Manhattan was made by the building of four 32-story apartments accommodating 960 middle-income families, and a bi-State bus terminal.

North Carolina.—An 8-mile section of I-40 was completed during the year by conversion of an existing 2-lane road to 4-lane with Interstate standards, at a cost of \$3 million. Forty miles of I-40 were open to traffic from Greensboro west.

North Dakota.—Paving work was underway on 18 miles of I-94 west of Hebron. Gravel was being hauled to the site from 110 miles away. This and adjoining projects to be completed next year will provide 64 miles of freeway from Dickinson to New Salem.

Ohio.—The 8-mile Euclid spur connecting portions of I-90 east of Cleveland was opened just after the close of the year. The \$13 million spur also connects with I-271, and includes two three-level interchanges. I-90 was in use for 72 miles from downtown Cleveland to the Pennsylvania State line. An interesting feature of the newly completed section is a retention basin which provides gradual discharge into a local storm sewer of the rainfall runoff from most of the spur route. Construction of the basin eliminated the need for an expensive new drainage system, and incidentally provided 1½ million cubic yards of dirt needed for roadway embankment.

Oklahoma.—During the year the last projects were completed on a 95-mile section of I-35 from the Kansas State line to 8 miles north of Oklahoma City. From that point south 48 miles to Purcell, I-35 was largely completed. Some 350 continuous miles of 4-lane expressway were open to traffic, via I-35 and I-70, from Oklahoma City to Kansas City.

Oregon.—The opening of a 16-mile project during the year made a continuous stretch of I-5 available to traffic from Grants Pass to Medford. The 40-mile section, which cost \$25 million, is 3 miles shorter than the old highway and saves 22 minutes in driving time. Another 125-mile stretch of I-5 was in use,



Interstate Route 91 in southern Vermont was designed to blend with the scenery. Here one roadway, skirting a picturesque ledge, is at a higher elevation than the other.

from Portland to Cottage Grove, and work was underway on an additional 33 miles.

Pennsylvania.—A section of I-81 north of Scranton, described in last year's report, received a national award in 1962 as the Nation's best example of a "driver's road"—a combination of scenery, speed, and safety exemplifying imaginative highway design.

Rhode Island.—An important interchange of I-95 and I-195 in Providence was completed during the year and an adjacent section was under construction.

South Dakota.—A 13½-mile section of I-90 from Sioux Falls to the Minnesota State line, costing \$6½ million, was opened to traffic during the year. It had greatly reduced traffic on U.S. 16, which had poor alinement and a rough pavement.

Tennessee.—An 8-mile section of I-40 near Newport, opened to traffic during the year, included a \$4 million bridge one-half mile long across Douglas Lake, a TVA reservoir on the French Broad River.

Texas.—Completion of a 2½-mile project in San Antonio during the year made possible a 100-mile nonstop freeway trip on I-35 from south of San Antonio to north of Austin. While the old route through San Antonio is 8.8 miles long, compared with 10.4 miles on I-35, trips on the latter take less than half the time.

Utah.—Traffic between the center of Salt Lake City and I-15 and I-80 will be served by two viaducts being built at a cost of \$5½ million. The 4,800- and 5,700-foot viaducts include four structure types: reinforced concrete box girder, continuous welded steel girder, prestressed concrete girder, and prestressed-precast concrete beams.

Vermont.—A 3-mile project on I-91 near the Putney-Westminister town line was near completion at the close of the year. This scenic section will extend the 22 miles of I-91 already in use north from the Massachusetts State line.

Virginia.—Two sections of I-95, one from Ashland to Richmond and one south of Emporia, were completed during the year, thus providing 100 miles of continuous freeway from Ashland to Weldon, N.C. (This includes the 35-mile

Richmond-Petersburg Turnpike, completed in 1958.) Construction of the segments of I-95 from Ashland to the North Carolina line (excluding the Turnpike) cost \$23.8 million.

Washington.—Work continued on the Seattle Freeway, I-5, scheduled for completion in 1966. To carry anticipated traffic the 24-mile urban freeway, expected to cost \$99 million, has from 6 to 12 lanes, with a reversible lane section to give added capacity in the most critical area.

West Virginia.—A recently completed 5-mile section of I-64 east of Huntington was soon to be linked up with a 16-mile section under construction. U.S. 60, which had been inadequately carrying 8,000 vehicles a day, had already lost 2,600 to the short Interstate section open to traffic.

Wisconsin.—An additional 30 miles of I-90 were opened to traffic during the year, making possible continuous freeway travel for over 200 miles on I-90, from the Wisconsin Dells to Chicago. Travel time between the two places was reduced by as much as 2 hours.

The ABC Program: The Federal-Aid Primary and Secondary Systems

Federal-aid improvement of primary highways

THE FEDERAL-AID PRIMARY HIGHWAY SYSTEM, as of December 31, 1962, covered 265,489 miles of the principal highways of the Nation and included 238,853 miles of main rural roads and 26,636 miles in urban areas. These mileages include the Interstate System which by law is a part of the primary system.



U.S. 60 in New Mexico was improved with Federal-aid primary funds for 8½ miles from Socorro westerly. The old road, substandard in width and curvature, had a poor accident record.

Federal-aid primary fund authorizations, which may be used for either rural or urban portions of the primary system, have ranged upward in recent years from \$247.5 million for fiscal year 1954 to \$427.5 million for fiscal year 1964 of which \$316,617,187 was apportioned on October 24, 1962, and the remainder on November 28, 1962.

During the fiscal year 5,037 miles of improvements, estimated to cost over \$869 million and involving \$458 million of Federal-aid primary funds, were programed.

Improvements involving Federal-aid primary funds were completed during the year on 4,948 miles of the Federal-aid primary system at a total cost of \$737 million of which \$388 million was Federal aid. The projects completed included 4,184 miles of bituminous and portland cement concrete surfacing, 965 bridges over streams, and 214 bridges over highways to provide traffic grade separations. In addition, railway-highway crossings were eliminated by construction of 96 grade-separation structures and 42 existing structures were reconstructed; 85 grade crossings were protected by installation of signal devices.

Federal-aid improvement of urban highways

HIGHWAYS IN URBAN AREAS eligible for improvement with Federal aid as of December 31, 1962, totaled 43,413 miles of which 26,636 were on the Federal-aid primary system (including the Interstate System) and 16,777 on the Federal-aid secondary highway system.

During the fiscal year 37 percent of all work programed on the Interstate System was for improvement in urban areas. This is somewhat less than the urban share of the estimated cost of improving the Interstate System and of travel in the United States; in both cases the urban proportion being nearly half.

Federal-aid urban fund authorizations have increased in recent years from \$137.5 million for fiscal year 1954 to \$237.5 million for fiscal year 1964 of which \$175,898,438 was apportioned on October 24, 1962, and the remainder on November 28, 1962. During the year, in addition to the funds approved for projects from the Federal-aid urban authorizations, 10 percent of all primary Federal-aid highway funds were approved for urban highway work.

Plans approved for Federal-aid construction projects in urban areas during the past fiscal year totaled \$2.05 billion and covered 1,223 miles of highway improvement. Of this total, \$1.58 billion was Federal aid, comprised of \$253 million from the urban authorizations, \$48 million from the primary fund authorizations, \$21 million from secondary fund authorizations, and \$1,253 million from Interstate funds.

Federal-aid construction work in urban areas completed during the fiscal year consisted of 912 miles of highway improvements costing \$1,272 million of which \$954 million was Federal aid. The completed work included 786 miles of bituminous and portland cement concrete surfacing, 251 bridges over streams and rivers, and 756 bridges to provide traffic grade separations between crossing highways. In addition, 176 railway-highway separation structures were completed and 21 existing ones were reconstructed, and 59 railroad grade crossings were protected by installation of signal devices.

Secondary or farm-to-market roads

THE FEDERAL-AID SECONDARY NETWORK of farm-to-market, feeder, schoolbus, and mail-route roads is the largest of the Federal-aid highway systems. Its length as of December 31, 1962, was 621,189 miles, including 16,777 miles of extensions into or through urban areas. The Federal-aid authorizations for



U.S. 1 in Brunswick, Maine, is now a 4-lane divided, controlled-access highway from the Maine Street interchange easterly. The 3-mile project, completed during the year with Federal-aid urban funds, bypasses four traffic signals and two railroad grade crossings.

this system have increased from \$165 million for fiscal year 1954 to \$285 million for fiscal year 1964 of which \$211,078,175 was apportioned on October 24, 1962, and the remainder on November 28, 1962.

During the fiscal year a total of 11,510 miles of improvements, estimated to cost \$603 million and involving \$322 million of Federal-aid funds, was approved on the secondary system. Improvements were completed during the year on 12,395 miles of the secondary system at a total cost of \$529 million involving \$274 million of Federal-aid funds. Of the improvements completed, 8,513 miles involved bituminous or portland cement concrete surfacing, 3,143 miles were gravel or stone surfaced, and 689 miles were graded and drained preparatory to receiving surfacing. Also completed were 1,849 bridges over streams and 14 bridges over highways; 50 new railway-highway grade separation structures and reconstruction of 11 others; and protection of 215 other railway-highway crossings by signal devices.



This Texas farm-to-market road, improved with Federal-aid secondary funds, serves farms, ranches, mines, and tourists on its 65-mile course from Presidio downstream along the Rio Grande and then over the mountains to Big Bend National Park.

The Federal-aid secondary program differs from other Federal-aid highway programs in that the system is not limited in length and the routes of the system and the projects to be constructed are selected cooperatively by the State highway departments and local highway officials. Another difference is that under the 1954 Act the administrative procedure between Public Roads and the States in carrying on the secondary program may be simplified by the States assuming full responsibility by certification to the Secretary of Commerce. All States except Alaska, Hawaii, Indiana, and the District of Columbia have assumed this responsibility.

The nine-member Board of County Engineer Advisors continued to meet with Public Roads officials to promote better mutual understanding on the Federal-aid secondary program among county engineers, the State highway departments, and Public Roads, and to give effective counsel and advice.

The Highway Trust Fund and Reimbursement Planning

THE FEDERAL-AID HIGHWAY PROGRAM is financed from the Highway Trust Fund established by the Highway Revenue Act of 1956. The Trust Fund's revenue comes from certain Federal highway-user excise taxes earmarked by the same Act, as amended in 1959 and 1961.

Net Trust Fund receipts during fiscal year 1963 totaled \$3.293 billion and expenditures from the Trust Fund amounted to \$3.017 billion. Total revenues of the Trust Fund in the seven fiscal years 1957-63 amounted to \$17.2 billion and expenditures for the same period totaled \$16.5 billion.

The Federal motor-fuel taxes provided three-fourths of the year's revenue accruing to the Highway Trust Fund, and the taxes on rubber constituted the second largest revenue source. Net receipts by tax source during fiscal year 1963, and the tax rates in effect on June 30, 1963, are shown in the table on this page.

Status of the Highway Trust Fund, fiscal year 1963

	Amount (thousand dollars)	Percentage of total income
Balance, July 1, 1962.....	\$470, 661	-----
Income, fiscal year 1963:		
Tax rates and revenues (net, after refunds):		
Motor-fuel taxes: 4 cents per gallon.....	2, 461, 966	74. 8
Tires, tubes, and tread rubber: 10 cents per pound on highway tires and tubes; 5 cents per pound on other tires and on tread rubber.....	408, 294	12. 4
Trucks, buses, and trailers: 10-percent tax on manufacturer's whole- sale price.....	311, 120	9. 4
Heavy vehicle use: \$3.00 per 1,000 pounds annually on vehicles of over 26,000 pounds gross weight.....	97, 318	3. 0
Total excise revenue.....	3, 278, 698	99. 6
Interest earned.....	14, 268	0. 4
Total income.....	3, 292, 966	100. 0
Disbursements for highways, fiscal year 1963.....	3, 016, 701	
Balance, June 30, 1963.....	746, 926	

Reimbursement planning

REIMBURSABLE OBLIGATION CEILINGS, sometimes referred to as "contract controls," have been in effect since October 1959 as a means of regulating new obligations on Federal-aid highway projects so that the Federal funds required to reimburse the States for work done will not exceed revenues accruing to the Highway Trust Fund. Federal funds are "obligated" when the States are authorized by Public Roads to proceed with preliminary engineering work, right-of-way acquisition, or advertising for bids on construction projects.

Reimbursable obligation releases to the States for the fiscal year 1963 totaled \$5.788 billion. The States actually incurred reimbursable obligations totaling \$4.149 billion during the fiscal year 1963.

Administration and Management

Organization

SEVERAL MAJOR REORGANIZATIONS were effected in Public Roads' Washington office during the year which have greatly improved operating efficiency. The former Office of Operations was abolished and its functions consolidated with those of the Office of Engineering, which has been renamed the Office of Engineering and Operations. The new office is responsible for both Federal-aid engineering and direct Federal construction, and will be able to operate much more effectively in administering these often closely related activities. The Office of Research and Development was reorganized to provide more logical and manageable groupings of related research and development functions and to provide stronger leadership among the State highway organizations, particularly in the promotion and surveillance of the use of Federal-aid funds available to them for highway research purposes. The Finance Division was realigned by grouping all accounting operations under one branch and by separating the accounting systems responsibilities between internal and external needs: the one to give special attention to the needs within Public Roads, and the other

for the promotion of financial management improvement programs in the several State highway departments.

Two new primary units were established at headquarters level to strengthen administrative control over the expanding Federal-aid highway program. The Office of Right-of-Way and Location was established to provide greater emphasis and leadership to the States and Public Roads field offices in the important and sensitive field of right-of-way acquisition and management. The Office of Audits and Investigations was established to strengthen control over Federal-aid funds and to provide measures for curbing irregularities in the highway program. This new organization has responsibility for all internal and external audits, and Public Roads field auditors report directly to it.

Financial management

PUBLIC ROADS' FINANCIAL MANAGEMENT structure consists of three principal elements—finance, budget and management, and program analysis. Data processing is a related activity because its services are widely used in carrying out these functions. During the year specific instructions were completed on preparation of the annual budget, providing Public Roads offices with procedures which will permit advance budget planning on a standard format and uniform basis.

Computer programing of Federal-aid construction allotment records previously handled by electric accounting machine was accomplished during the year. Reports and tabulations that required 1,300 hours of machine time are now produced in a more meaningful and condensed form in 123 computer hours.

Continuing emphasis was placed on the cooperative program for financial management improvement with State highway departments. A quarterly bulletin was started to disseminate information on financial management improvements made in various States. Financial management reviews by Public Roads in Alaska and Indiana influenced a reorganization and upgrading of their financial operations. A report on the long-range cooperative financial management study with Iowa was completed, and copies were provided to all States to stimulate work in this area. Four meetings (involving seven Public Roads regions) of Public Roads and State highway department financial and administrative officials were held to discuss items of mutual interest.

During the year seven additional States undertook billings to the Bureau of Public Roads for Federal-aid reimbursement under the recently developed concurrent audit program, making a total of nine doing so. Progress was being made toward adoption of this program in the remaining States, in varying degrees. Public Roads encouragement of the States to undertake audits of railroad and utility claims has resulted in 21 States assuming this function, and all States are expected to do so during the coming year.

The Bureau's formal accounting manual was completed during the year and was being reviewed.

During the year, the Office of the Secretary of Commerce adopted Public Roads' management information system for manpower utilization and control. The system integrates payroll, personnel accounting, and fiscal accounting systems to provide reliable and timely information for personnel reporting and for budget preparation and control.

Manpower utilization and training

During the year a special committee was established in Public Roads to consider immediate needs in the areas of management, training, and utilization of manpower. A detailed study was made of area and district engineer workload data, covering an 8-month period, as reported by field offices. The study data in turn were used by the regional offices in making an extensive analysis of

area and district engineer workload statistics for their respective regions. An analysis of these studies was made by the Washington office, upon which changes or refinements in the program will be based.

A special study of Public Roads' right-of-way manpower utilization and needs, undertaken during the year, was nearing completion.

Plans were being made for beginning two continuing 2-year training programs next year. One of these, to accommodate three new trainees each year, will prepare recent college graduates for careers in the field of highway safety. The other program, to accommodate 15 new trainees each year, will train recent college graduates in right-of-way activities as they relate to the Federal-aid highway program.

Labor compliance manuals

During the year Public Roads developed two labor compliance manuals, for Federal-aid and direct Federal construction contracts. The manuals present all labor compliance standards required by the Federal Government and contain applicable laws, regulations, directives, and forms used in labor enforcement; instructions for applying and enforcing each requirement; and summaries of interpretive rulings by the Department of Labor. The manuals have been of considerable assistance to Public Roads and State highway department labor compliance officials.

Audits and Investigations

THE OFFICE OF AUDITS AND INVESTIGATIONS was established on July 9, 1962, in Public Roads as a primary unit with responsibility for the audit of States' claims for the Federal share of the cost of Federal-aid highway projects, the independent and comprehensive examination in depth of all Public Roads activities and programs, and the investigation of allegations of irregularity and fraud in Public Roads programs.

Audits of States' claims

DIRECTION AND CONTROL of auditing of States' claims for reimbursement on Federal-aid projects was centralized in a new Audit Division in the Office of Audits and Investigations during the year. All audit personnel in the Washington, regional, and division offices were transferred to this division. Regional audit managers were designated and assumed the responsibility for the audit function previously exercised by the regional office executive officers. Divisional audit areas were established to execute the field audit responsibility and to provide the second level of audit supervision formerly performed by division office administrative managers.

Compliance examinations

THE OFFICE of Audits and Investigations is responsible for the independent and comprehensive examination in depth of every aspect of Public Roads activities and programs, to determine whether they are conducted and expenditures are made in an effective, efficient, and economical manner and in compliance with applicable laws and regulations and with Public Roads policies, engineering standards, operating procedures, and approved plans and specifications.

During the fiscal year, reviews of construction supervision by State and Public Roads engineers were made in three States, disclosing need in each State to pursue a more vigorous policy of recruitment and training. A study was made of the organization and operations of Public Roads' Region 15, which administers Public Roads road-building activities in Eastern National parks and forests. A review was initiated in the Washington office of certain accounting practices. Reviews and evaluations of right-of-way practices were started in two States.

Top highway officials in some States have become interested in developing their own internal audit surveillance staffs and investigative units. Public Roads assisted them in this work, and also participated in discussions with other agencies at the request of the Bureau of the Budget in exploring the feasibility of cross-servicing audits between Federal agencies and reducing the layering of audit through reliance on State audits. The reduction in duplication of review will result in improved manpower utilization and a more effective service to management.

Investigations

NUMEROUS ALLEGATIONS of irregularities or possible violations of Federal laws were being investigated by the Office of Audits and Investigations. These pertained to such allegations as falsification of records, collusion, attempted bribery, and conspiracy to defraud the United States Government.

During the fiscal year, active investigations were conducted on 80 separate allegations. In many of these cases, investigation revealed that the original information or allegation was without basis in fact. However, investigations were the basis for administrative suspension from any participation in Federal highway projects for seven individuals or organizations for periods ranging from 6 months to 3 years. Also, as part of Public Roads' investigative program, 26 cases were referred to the U.S. Department of Justice for consideration of possible violation of Federal laws. At the close of the year, pending matters requiring investigative action totaled 162 cases, located in 32 States.

Highway and Transportation Planning

National planning activities

RECOGNIZING THAT the Highway Trust Fund and the authorized program for completion of the 41,000-mile Interstate Highway System will terminate in 1972, plans were tentatively being made for a comprehensive study of the future needs of the Federal-aid highway systems and the policies and procedures that should govern a continuing Federal-aid program. It was contemplated that such a study would include consideration of (1) the future extent, capacity requirements, service characteristics, and costs of the Interstate System; (2) similar information for other Federal-aid primary and Federal-aid secondary highways, with particular emphasis on the need for urban improvements; and (3) the policies and procedures of Federal-aid financing, including Federal-State participation ratios, methods for apportionment of Federal-aid funds among the States, and the level of revenue provision for the continuing Federal-aid program.

Urban planning activities

THE IMPORTANCE to the national interest of developing transportation systems in a manner that will serve the States and local communities efficiently and effectively was fully recognized by the inclusion in the 1962 Federal-Aid Highway Act of the requirement that after July 1, 1965, Federal-aid highway projects submitted for approval in any urban area over 50,000 population are to be based on a continuing, comprehensive transportation planning process carried on cooperatively by States and local communities.

In carrying out its planning function as concerned with urban and metropolitan areas, Public Roads, in cooperation with the State highway departments, expanded its efforts in developing long-range plans and programs for highway transportation which are properly coordinated with other forms of transportation and integrated with development plans for the community to serve future transportation needs and help shape its growth along the lines desired by its citizens.

Public Roads continued to have close working arrangements with other Federal agencies, particularly the Housing and Home Finance Agency, to assure that all types of Federal planning assistance are coordinated in urban and metropolitan areas. By frequent interchange of information and regular meetings of joint committees of the two agencies, both in Washington and the several regions, State highway departments and State planning agencies have been encouraged to coordinate their programs.

Public Roads endorsed and actively supported the Action Program for Urban Transportation Planning, which was jointly initiated in January 1962 by the American Association of State Highway Officials, the American Municipal Association, and the National Association of County Officials. The Action Program has been directed initially at cities having population of 50,000 to 250,000. Public Roads assisted in organizing regional meetings to stimulate interest on the part of local officials, and provided technical assistance to pilot studies initiated in selected cities to demonstrate organizational and technical procedures.

A series of nine regional conferences was held to outline and define the program, with approximately 1,300 Federal, State, county, and municipal officials having a responsibility for urban transportation planning participating. The final conference in the series was held July 1, 1963, in Albany, N.Y.

The transportation planning requirements included in the 1962 Federal-Aid Highway Act in effect endorsed the scope and objectives of the AASHO-NACO-AMA Action Program.

During the year comprehensive urban transportation planning studies with Bureau of Public Roads' cooperation were started in many additional cities, bringing the total of such studies underway to 149 in the 216 urban areas covered by the 1962 act. Technical assistance was provided to Bureau field offices, State highway departments, and local agencies or study staffs in the organization and conduct of these studies, including data collection, analysis, applications of electronic computers, and plan development and evaluations.

The urban transportation planning process has the inherent requirement of assembling in an orderly manner huge amounts of data that relate to the social and economic characteristics of the population, the land use configuration of the area, and the amount and characteristics of travel resulting therefrom. The use of electronic computers has made it practical to examine these data and their relationships in considerable detail and as a result develop more efficient, economical, and accurate procedures for urban transportation planning. Public Roads intensified its effort in this field during the year. As rapidly as possible analytical procedures using electronic computers were being developed and improved, and the individual procedures were being welded into an overall system approach.

Improvements in the use and application of the procedures during the past year included the following:

1. More comprehensive editing and checking programs were prepared to insure the reasonableness and accuracy of data.
2. A new procedure was developed to permit the forecasting of travel by purpose of trip, vehicle type, and area of city. Mode of travel and land use at the ends of the trip are also projected. Trip-maker characteristics such as occupation, industry of employment, and sex could also be incorporated in the procedure. The procedure provides the same degree of detail for future trips as furnished in the original travel inventory.
3. A project was initiated to incorporate all procedures on a particular computer into one overall system making it possible easily and quickly to select from several programs the one most suitable for a specific problem with the assurance that compatibility between the programs will be maintained.

The library of computer programs available to the States and others from the Bureau of Public Roads for use in urban studies totaled well over 100.

There was a growing interest in the use of simulation models to predict future patterns in urban areas. A variety of mathematical models has been proposed and several were in use in transportation studies throughout the country, the so-called "gravity" model being the most widespread in use. Using study data from Washington, D.C., Pittsburgh, Pa., and Sioux Falls, S. Dak., four tests were completed during the year to evaluate the accuracy and calibration requirements of the "gravity" model. The ability of this model to reproduce the present travel patterns already known from data obtained by a home-interview origin-destination transportation study was tested in a large and in a small city. The adequacy of data from small samples of home-interview survey data to calibrate the model adequately was also tested. Finally, the forecasting ability of the gravity model was investigated.

To stimulate additional research in the testing and development of urban travel models, Public Roads organized a seminar on this subject in Washington, D.C., in January 1963. Forty-five representatives from 10 States participated. At the end of the fiscal year, travel model research studies were underway in three States and additional studies were being initiated in four other States, all with Public Roads' technical assistance.

To facilitate the use of the gravity model in transportation planning studies, a manual was completed outlining in detail the procedures for calibrating and testing a gravity model using a series of computer programs developed for the IBM 7090 computer. A second manual describing similar procedures for use with programs for the IBM 1401 computer was nearing completion.

Simultaneously with the advancing research and preparation of instruction manuals on the gravity model, work was begun to interpret, test, and place into form for general operational use another urban travel model called the "opportunity" model (or sometimes the Schneider model).

Because of the demonstrated interrelationship between travel, the economy, and use of land in urban areas, a study was begun of the current techniques being used by transportation study groups to collect, analyze, and forecast such information, with the objective of recommending a program of future research and action to advance as rapidly as possible the best available techniques and methods.

Intensive 2-week training courses in traffic assignment and forecasting, utilizing electronic computers, were conducted in October 1962 and April 1963, providing 66 engineers and planners from Public Roads and State and local government agencies with a background in the techniques of forecasting the number and distribution of future trips for urban areas. These courses are part of Public Roads' continuing program of training for personnel of agencies having responsibility for urban transportation planning and plan implementation. Since it was first offered in October 1961, 141 have completed the course. Four additional 2-week courses have been planned for the 1964 fiscal year.

A survey and analysis of organizational procedures of selected noteworthy urban transportation planning studies was completed and a summary report of the findings including recommendations for organizing transportation planning studies has been prepared. Assistance was provided to an administrative study by the University of Arkansas of coordination needs in transportation and community planning for cities of less than 50,000 population. Continued assistance was provided to the Joint Committee of the American Association of State Highway Officials and the American Municipal Association, and to the AASHO Urban Transportation Planning Committee.

Advance planning activities

PUBLIC ROADS CONTINUED to assist the State highway departments in developing schedules of operations which will be converted into integrated programs of engineering operations, right-of-way acquisition, and construction to effectively use resources and assure that the entire Interstate System will be completed on schedule in 1972. Similar programing and scheduling techniques were being developed for application to all highway systems. These schedules will aid in analyzing work sequences and balancing manpower and resource requirements over long periods of time.

Initial steps were taken to use pavement roughness measurements, and the results of the AASHO Road Test, to obtain more precise ratings of pavement conditions than have been obtainable in the past and to predict when pavements will need to be retired or resurfaced. This will aid in the establishment of highway needs on a continuing basis.

Cooperation with the Highway Research Board Committee on Highway Programing was continued by participating in the analysis of State highway departments' existing construction procedures. This is a step in the long-range committee objective to establish systematic programing procedures. Emphasis during the year was directed to methods of scheduling preconstruction activities: surveys, preliminary engineering, design, and right-of-way acquisition.

A series of articles was begun, describing and evaluating methods of conducting comprehensive highway needs studies. The first, completed during the year, describes the forms of sponsorship and the basic organization for conducting all phases of comprehensive highway needs studies.

Assistance was furnished to States in studies of the classification of their highway systems on the basis of function. Such a classification provides a means for planning the physical development of highways in relation to the kind of service they are expected to provide, a framework for effective fiscal planning, and a basis for rational assignment of highway jurisdiction to the appropriate level of government.

In addition, Public Roads continued and intensified its assistance to States in measuring their present need for highway improvements and establishing levels of expenditures required to keep highway systems up to date. During the year highway needs studies were completed by four States, with varying degrees of assistance from Public Roads, bringing the total to date to 31. Two more were underway, and preparations were being made for three such studies to start next year.

Current planning activities

THE STATE HIGHWAY DEPARTMENTS, with Public Roads cooperation, continued a program of current planning activities involving many aspects of obtaining, analyzing, and using data in their overall highway planning programs.

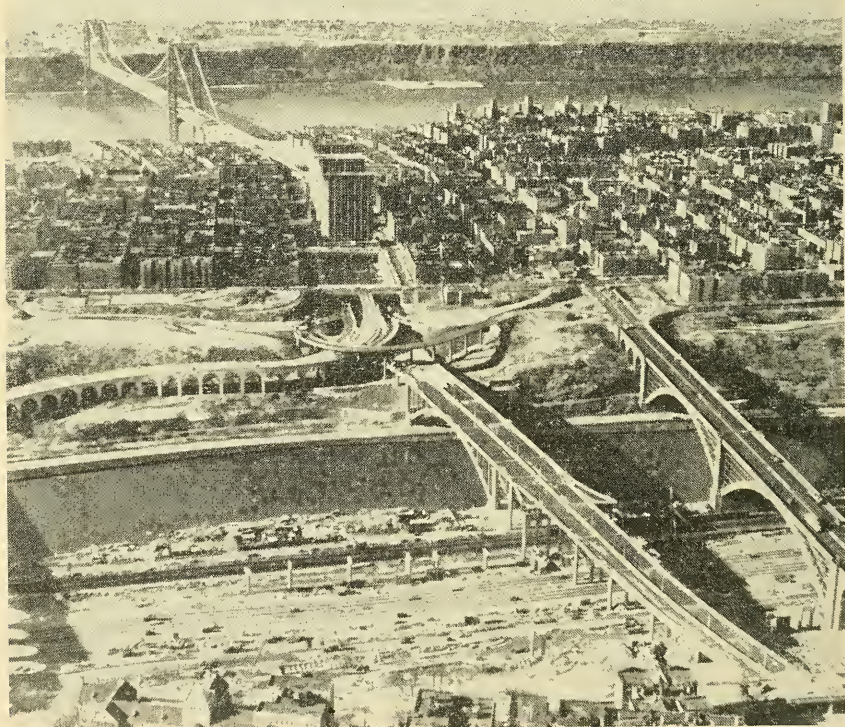
Continuing efforts were made to improve the accuracy of estimates of traffic volume, classification, and weight information. Pilot studies were inaugurated to provide the basis for evaluating the statistical reliability of weight data collected under a variety of conditions and to develop improved procedures for continuing weighing activities. Statistical comparison of weight data by vehicle type was being made in a number of States to provide better measures of determining minimum sampling to produce the required degree of accuracy. Other traffic studies underway included investigation of the relationship among peak hourly volumes in terms of the total flow for the entire day in order to improve the reliability of short counts.

Substantial progress was made toward completion of a highway planning program manual. This extensive manual will collect and update all existing Public Roads guide materials on highway planning activities.

Analyses were continued of the data from motor-vehicle-use studies conducted in 24 States since 1951. Montana was preparing to conduct a second such study, which will permit comparisons with its 1953 study and also will provide additional data.

Analyses were also continued of the nationwide data on motor-vehicle ownership and travel characteristics collected by the Bureau of the Census for Public Roads in the fall of 1959 and the spring of 1961. The study showed that 45 percent of all persons who travel to work by automobile have no public transportation available for such trips; the proportion was 59 percent for workers living in unincorporated areas as compared with 35 percent for those in incorporated places. Two-thirds of all persons who go to work by public transportation live less than two blocks from such transportation.

Road inventory information on rural roads and main city streets was updated in 49 States and Puerto Rico during the year. The data thus obtained are used for determining deficiencies and needs of the highway network in each State. Some 395 county highway maps were completed in 35 States. Also



Interstate Route 95 in crossing New York City spans Manhattan in a 12-lane depressed freeway linking the George Washington Bridge and the Cross Bronx Expressway. Three big apartment buildings and a bus station make spectacular use of airspace above the freeway. (Photographed prior to completion.)

completed were 20 State highway maps, 34 State traffic maps, 361 county traffic maps, and 862 maps of cities and unincorporated areas.

The comprehensive inventory of the Interstate System traveled-way was continued, and many States completed the second year's study. Analysis of the data on a nationwide basis was underway.

Traffic data for more than 1,800 continuous traffic-count stations were analyzed during the year to develop trends in highway traffic volumes. Highway travel on all roads and streets increased by 4.1 percent during the calendar year 1962. The travel increase on rural roads was 4.2 percent, as compared to 4.0 percent on city streets.

Route Location and Right-of-Way Acquisition

BECAUSE OF THE IMPORTANCE and sensitivity of the highway route location and right-of-way acquisition functions, the Bureau of Public Roads in September 1962 established as a primary unit a new Office of Right-of-Way and Location. The Office is comprised of three divisions and a special studies and application staff.

The Systems and Location Division is concerned with policy and procedure governing the nature and extent of the Federal-aid systems and the selection of Federal-aid routes and their specific locations, involving such subject areas as engineering and economic analyses, public hearings, and public utility relocation. During the year considerable attention was devoted to the resolution of specific location problems for the Interstate System, and emphasis was placed on early determination of all Interstate route locations so as to preclude any delay in completion of the system.

The Procedures Division is concerned with policy and procedure governing right-of-way elements of the Federal-aid highway program, providing technical advice to the States and Public Roads field offices, and evaluating their right-of-way activities and practices. During the year, comprehensive studies were made of the right-of-way organization and practices in several States, at their request.

The Appraisal and Acquisition Division maintains surveillance over and sets guides and standards for such State right-of-way activities as appraisal, appraisal review, negotiation, and management and disposal of property, relocation assistance, acquisition aspects of outdoor advertising control, and use of airspace above or below rights-of-way. It also appraises properties to be acquired by or for the Federal Government for highway right-of-way.

The Studies and Application Staff reviews State statutes, judicial decisions, policies and practices relating to right-of-way, access control, and roadside usage; relates severance damage studies to appraisal operations; provides right-of-way training for Public Roads and State right-of-way personnel; and assists in the development of new right-of-way management methods.

During the year a special staff group was designated to study Public Roads' right-of-way manpower utilization and needs, including development of workload indicators. At the close of the year the study was nearing completion.

Relocation assistance and payments

THE FEDERAL-AID HIGHWAY ACT OF 1962 introduced, for the first time, provisions for assistance to families and businesses displaced by Federal-aid highway improvements. The act requires that advice on problems of moving must be provided by the States to families who are displaced by Federal-aid highway projects; and where the State can legally pay for moving expenses of families or businesses, the Federal Government will share the cost within certain limits.

Both relocation assistance and payments are to be handled by the State highway departments.

Under the 1962 act, each State highway department is required to give satisfactory assurance that it is providing relocation advisory assistance to families displaced by Federal-aid highway improvements. Every State highway department was making use of a relocation assistance organization. For each scheduled Federal-aid highway project the State's offer to help is publicly announced and made readily available, generally at a local relocation office. Property owners and tenants can get detailed information on housing that is suitable in condition and in price or rental range. Those relocated are also informed about other public and private housing, loan, and welfare agencies which might be of help.

Many, but not yet all, State highway departments can legally pay for reasonable and necessary moving expenses of those who have to move because of scheduled highway work. Under the 1962 act such payments made in connection with Federal-aid projects are eligible for Federal reimbursement, limited to participation in moving costs of up to \$200 for an individual or family, and up to \$3,000 for a business concern, a farm, or a nonprofit organization. (Generally the Federal share is 50 percent on ABC projects and 90 percent on Interstate projects.)

Use of airspace on highway right-of-way

RECENT AMENDMENTS of the Federal-aid highway laws and regulations have made it possible to use airspace over and under highway right-of-way, for public or private uses of certain kinds, and Public Roads is actively encouraging the States to arrange such uses. In cases where a considerable savings in right-of-way costs can be effected, lands are acquired in limited vertical dimension, with private or public facilities occupying the space above or below such right-of-way.

During the year Public Roads approved airspace use, on Federal-aid projects, for vehicle parking, recreational purposes, storage and warehouse facilities, retention of manufacturing and other industrial facilities, and the construction of public buildings. These projects were located in 13 States. Outstanding was a proposal to construct a new city hall and associated buildings over Interstate Route 195 in Fall River, Mass.

Right-of-way practices

DURING THE YEAR Public Roads issued guidelines for the establishment of minimum qualifications to be possessed by appraisers, reviewing appraisers, and negotiators to be employed by State highway departments. Based on these guidelines, several States up-graded the qualification requirements of their right-of-way personnel.

Control of right-of-way activities was strengthened by issuance of procedure statements relative to the handling of non-reimbursable items, the number of appraisals needed, right-of-way certificates and appraiser's certificates, delivery of payments to property owners, reviewing appraiser salaries and expenses, and fee appraiser fees and contracts.

Public utility relocation

DURING THE YEAR Public Roads began a review of the procedures and practices used by each State highway department in the administration and coordination of public utility adjustments and relocations required by highway construction projects, including the use and occupancy of highway right-of-way by utility facilities.

A study was completed of liaison practices between the State highway departments and public utilities, including railroads, pipe lines, and others. An analysis and evaluation of data derived from thousands of questionnaire returns

from these groups, and suggestions for betterment of liaison practices, were published in the Highway Research Board's Special Report 77.

Right-of-way training

PUBLIC ROADS WAS PREPARING to initiate a 2-year right-of-way training program, involving 15 trainees annually, to satisfy its manpower requirements in this field. Training assignments will consist of planned on-the-job and formal training conducted by Public Roads, plus out-service training at selected universities.

Public Roads cooperated with the American Association of State Highway Officials in the preparation of a 763-page technical textbook, *Acquisition For Right-of-Way*, which was published by AASHO. Public Roads also cooperated with AASHO in the preparation of *An Information Guide for a Training Program of Right-of-Way Personnel* and *Mechanics Guide for a State In-Service Right-of-Way Training Program*, both to be published by AASHO. Public Roads was also working with the American Right-of-Way Association in a project seeking to identify training needs, desires, and possibilities. During the year several State highway departments were assisted in setting up appropriate right-of-way training programs.

Right-of-way studies

PUBLIC ROADS right-of-way and research personnel were collaborating in the analysis and use of the national "bank" of severance damage cases—those that involve the partial taking of property for highway purposes. The States were being encouraged, in the day-to-day appraisal operation, to use as comparables similar data derived from State banks of severance damage cases.

Public Roads assembled, analyzed, and evaluated some 500 condemnation cases adjudicated during the past year, and was preparing a report in cooperation with the American Bar Association.

Suggested qualifications, requirements, and salary ranges for eight different levels of State right-of-way employees were prepared. Studies were begun of the application of the critical path method to the scheduling of right-of-way projects, and a test application was made in one State. Technical assistance was rendered to a number of State highway departments on a large variety of right-of-way problems.

Highway Engineering and Design

Geometric design

PUBLIC ROADS CONTINUED its engineering cooperation with the State highway departments to develop overall highway designs including interchanges and complex urban sections that efficiently move large volumes of cars and trucks more safely and rapidly in and around cities, are economical to build, and are an asset to both the highway user and the community. For designs in rural areas, Public Roads continued to emphasize the advantages to be gained, at little or no extra cost, in pleasing appearance, added safety, and reduction in driver fatigue by separating the roadways of divided highways and blending them independently into the landscape.

Substantial lengths of Interstate highways have been completed in many States and some attained relatively high traffic volumes during the year. Public Roads engineers actively encouraged and assisted the State and city engineers concerned with design and operations to make various forms of informal evaluations on the layout details and specific geometric standards that had been used. While it was being found generally that the desired high-type, free-flowing and safe facility was being attained with proper economy of the public funds, certain details were identified for additional study for possible betterment in future

designs. Such an operational check-back on completed freeways is considered of high importance to insure that significant items have not been overlooked.

Where there is choice of alternates in materials to be incorporated in the highway work, additional studies were instigated to determine those types and details that are in the best public interest.

Public Roads cooperated with State and city officials in further studies of the estimated future traffic volumes on certain sections of urban arterial highways and the physical and developed conditions in order to make decisions as to the proper number of traffic lanes to be provided. It is not always physically possible or economically feasible to provide enough lanes on a high-type urban highway to accommodate the estimated future traffic volumes that might be attracted to it. Extensive detailed studies of all logical alternates necessarily were made, to consider all factors. The overall effect on the existing and future city development is a major item being considered, even though tangible evaluation factors are difficult to define.

Design engineers actively cooperated with highway planning engineers and those of other disciplines in the continuing process of developing and keeping up to date the optimum feasible method of providing transportation facilities at reasonable total cost in the large, densely populated cities. Inasmuch as any realistic planning involves application of established design standards in the highway route concepts, and some early form of preliminary plans and estimates, continued efforts were being made that such features properly are considered in the planning stages.

During the year Public Roads encouraged the States to provide physical barriers in narrow medians on high-volume divided highways or at accident-prone locations on lower-volume highways. Spectacular, multiple-fatality accidents on divided freeways have been caused by vehicles crossing narrow medians into the face of oncoming traffic in the opposite roadway. Surveys were undertaken by Public Roads to determine throughout the nation the guides being used to anticipate where these severe accidents might logically occur and to eliminate the occurrence of the accidents by suitably designed barriers constructed of concrete, steel plate, mounded earth, or steel cables. While experience so far in these features is limited to relatively few areas, work was progressing toward establishment of useful criteria.

Design standards, policies, and guides

PUBLIC ROADS CONTINUED cooperative assistance to committees of the American Association of State Highway Officials in the development of design standards, guides, and policies. During the year AASHO completed and published a revised edition of *A Guide for the Application and Design of Frontage Roads on the National System of Interstate and Defense Highways*, which includes a section on design considerations.

AASHO's *Geometric Design Standards for the National System of Interstate and Defense Highways* was modified to permit continuation of the full approach roadway width across certain classes of long bridges as well as short bridges on heavily traveled Interstate routes in urban areas. Expected benefits are improved safety and a reduction in congestion, particularly that which is caused by stranded or disabled vehicles on the structures.

During the year Public Roads worked with State officials in the immediate application of the AASHO *Geometric Design Standards for Highways Other Than Freeways*, published in July 1962. Review of the separate State standards, which generally follow the AASHO approved statements, was undertaken in all States and adjustments put into effect where differences were significant. There was a substantial upgrading of the secondary system standards in many States as a result of the new AASHO values.

Pavement and base design

IN FURTHER USE of the major research data resulting from the AASHO Road Test, a guide procedure for the design of rigid pavements for highways was developed by the AASHO Operating Committee on Design and approved for trial use by the State highway departments. During the previous year a corresponding guide for the design of flexible pavements was developed. These guides were proving to be of major value to highway designers since for the first time they provide adequate tools for designing pavements for the anticipated number and weight of wheel-load applications, taking into account the other major variables concerning soils and materials used. Public Roads assisted State specialists in review and trial use of these guides, and in the establishment of correlation studies of the various factors for the conditions and practices in the individual States.

Bridge design

CLOSE COOPERATION continued between Public Roads and the States in the planning, design, and construction of highway bridges on the Federal-aid highway system. Technical assistance on bridge planning and construction was furnished on the Inter-American Highway and to other countries.

A number of noteworthy bridges were in the design or construction stage in the Federal-aid program. The 6-lane Mississippi River bridge at Baton Rouge, with a center span of 1,235 feet, is the second longest cantilever structure in the U.S. The 8-lane Missouri River bridge at St. Louis, with a 650-foot center span, is the nation's longest plate-girder structure, and the first large structure in the U.S. using the advantages of an orthotropic plate design.



Interstate Route 90 slopes down from the foreground to cross an impressive structure over the Columbia River near Vantage, Wash. The old bridge at this location was removed, since it would have been submerged after completion of Wanapum Dam downstream. The public utility district which built the dam contributed \$4 million toward the new bridge.

A revised edition of *Standard Plans for Highway Bridges*, in four parts, was published during the year. A fifth part, covering pedestrian overpass structures of steel, concrete, aluminum, and timber, was being prepared.

Data were assembled on the number and type of movable bridges on the Interstate System, together with information regarding costs, clearances, and number of openings. A fee and service study of consulting engineer contracts for the design of tunnels and large bridges was begun. Special studies made on bridge geometrics and costs included one of the numbers of bridges of most frequently used roadway widths on the Interstate System tabulated for bridge lengths up to 400 feet. Average bridge costs per square foot of deck based on engineer's estimates were compiled for analysis on a State and regional basis. A study was made of low, high, and average unit prices being paid by the various States for structural steel of **WF** beams, welded plate girders, and riveted plate girders. A comprehensive study of the cost of overpass structures over Interstate highways resulted in efforts in certain parts of the country to design more economical structures.

Public Roads continued to stress the importance of hydraulic design in highway work and more States assigned engineers to this field. Consulting advice was given on several major bridge projects and flood protection works during the year. Flood data, research information, and technical assistance were obtained from several State and Federal agencies and existing and proposed flood-control projects were considered in highway designs to realize the maximum benefit from public funds. Possible expanded use of electronic computers for the solution of hydraulic problems was being studied, and programs for the hydraulic design of circular and metal pipe arch culverts were prepared. Seminars on hydraulic problems related to highways were conducted in several field offices in cooperation with the State highway departments, to train personnel and promote good drainage design.

Public Roads provided technical advisory assistance to the States on numerous problems involving the analysis, design, and construction of complex and difficult pier and retaining wall foundations, and the stability of embankment approaches to bridges. Resulting changes in design plans and construction operations saved thousands of dollars. Specialized instruction in soils and foundations was given to a number of Public Roads Washington and field office engineers.

A Federal specification for corrugated metal pipe and structural plate pipe was revised and submitted to the General Services Administration for issuance as an interim specification. It includes use of resistance spot-welded fabrication and bituminous coatings for pipe.

A new structural steel specification with improved chemical controls was developed to provide steel acceptable for both riveted and welded bridges. This steel has higher yield strength than the old structural carbon steels, permitting higher working stresses and allowing substantial savings since the new steel costs about the same as the lowest price structural steel previously used. It will simplify steel construction practices by replacing two grades of steel with one.

A committee representing 12 steel producers and Public Roads was organized and started development of a common specification for the several relatively low-cost, high-yield-strength vanadium and columbium structural steels now being produced. The specification when completed will provide for a weldable quality high-strength steel, in thicknesses suitable for bridges, and obtainable through competitive bidding.

A specification was developed, in cooperation with the manufacturers, for the material, construction, and testing of welded stud shear connectors as used on

composite steel bridges. This will promote standardization and resulting economy in a field that presently has a number of varying specifications.

The study of the effectiveness of bridge railings as protective barriers continued and there was improvement in understanding the impact forces of vehicles and the structural requirements to resist them. It is intended from these studies to develop acceptable specifications for the design of railings.

Public Roads completed a study of fatigue failure in welded steel bridges during the year. The study was based primarily on fatigue failures of partial length cover plates of girders, since reliable laboratory data pertaining to this type of failure were available, but it was recognized that there are other critical sections in girders for which the results of the study were also representative. The study clearly showed the effect of various allowable axle loads on the fatigue life of a structure.

Public Roads participated in research on the effects of geometry and boundary conditions on welded plate girders of carbon steel and quenched and tempered alloy structural steel subject to static and fatigue loads in cooperation with Lehigh University, University of Illinois, the Pennsylvania State Highway Department, the American Institute of Steel Construction, and the Welding Research Council. Improved design specifications and details have already resulted from this research.

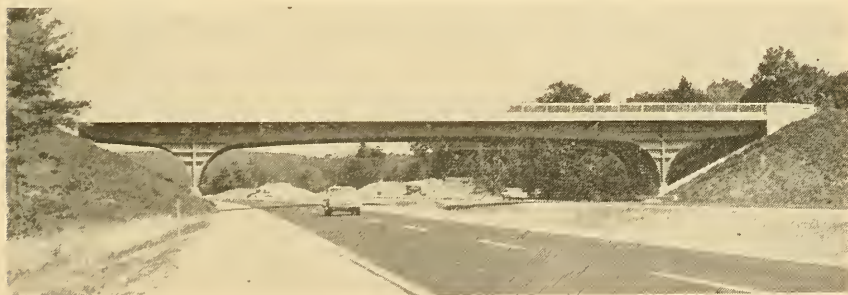
Research was underway in cooperation with the Reinforced Concrete Research Council and Cornell University to increase tensile working stresses of high-strength reinforcement without abnormal cracking or jeopardizing the integrity of reinforced concrete structures.

Other bridge research is described elsewhere in this report.

Navigational clearance requirements

DURING THE YEAR, efforts to obtain reasonable navigation clearances at highway crossings of the Nation's navigable streams continued, resulting in highway construction cost savings of \$2.1 million. In addition, difficulties regarding the vertical clearances to be provided on the Mississippi and Sacramento Rivers were resolved. The final decision in these cases will result in some saving of highway construction funds. Efforts during the year also resulted in the retention of several reaches of waterways in the advance approval category. This activity not only resulted in highway construction savings but also in an acceleration of the highway construction involved. All of these activities will also result in the reduction of future bridge maintenance and operation costs and future vehicle operation costs.

During the year the law covering the reconstruction of highways relocated because of the construction of water resources projects was revised to authorize



The Ash Street bridge over Interstate Route 93 in Londonderry, N.H., was a prize-winning entry in a bridge design competition.

the reconstruction of such roads to current standards for current traffic. This applies to projects constructed by both the Corps of Engineers and the Bureau of Reclamation.

Fish and wildlife protection

Recognizing that fish and game are a natural resource, Public Roads was supporting efforts in the planning, location, design, and construction of highways to cause a minimum of disturbance to, and reasonable preservation of, fish and wildlife habitats. To implement this in relation to the Federal-aid highway program, Public Roads requested each State highway department to adopt a procedure that would provide for suitable coordination with the appropriate State conservation agency.

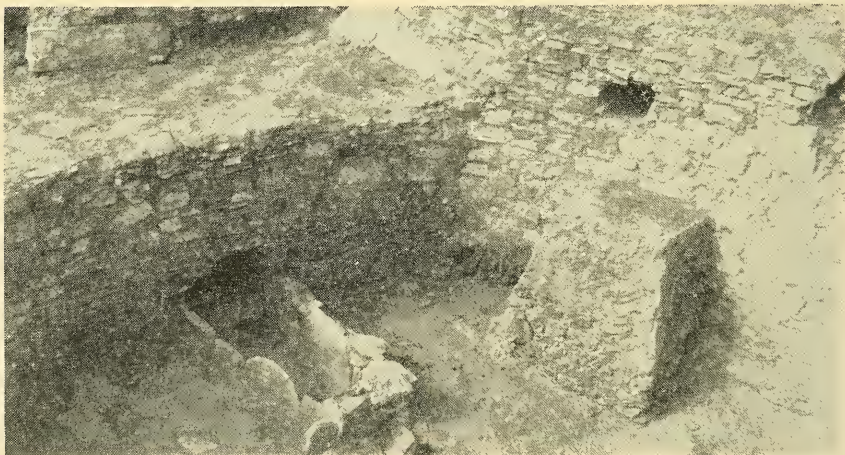
In addition, after January 1, 1964, Public Roads will require the States to certify, for each Federal-aid project, that due consideration has been given to the effects of the proposed project on fish and wildlife resources.

Highway esthetics and landscape development

DURING THE YEAR, Public Roads stressed that serious consideration should be given in the location and design of highways to the elements included under the general concept of esthetics, including the effects on communities, park lands, and areas of historical and archeological significance. Collaboration was continued with the State highway departments in furthering landscape development as an integral part of highway design for optimum economy in construction and maintenance, particularly in the overall development of complex interchanges on the Interstate System.

Staff specialists continued to work cooperatively with committees of the American Association of State Highway Officials in preparing the revised guide for landscape design to aid the States in applying the AASHO *Policy on Landscape Development*.

During the year, Public Roads cooperated with State highway departments and industry in the evaluation of new materials and improved equipment being



A small kiva (ceremonial chamber) within a 20-room pueblo exposed in a joint archeological salvage project of the Arizona Highway Department, the University of Arizona, and the Museum of Northern Arizona. The work, financed with Federal aid, was performed along the location of Interstate Route 40, prior to construction.

developed for roadside use. Roadside research and demonstration studies were continued under cooperative agreements with State highway departments, in cooperation with educational institutions, in the selection and development of vegetative materials most effective for control of erosion, functional planting, and maintenance economy.

Use of aerial surveys

INVESTIGATIONS WERE CONTINUED in the use of aerial color photographs for making construction materials surveys. Preliminary investigations were made to determine the potential uses and value of infrared (thermal) imagery and infrared photographs for ascertaining ground conditions, locating sources of suitable construction materials, and determining other natural features that affect highway locations. Analyses were continued toward development of improved photogrammetric instruments for mapping; for making precision measurements of specific points, such as profile and cross sections and property corners; for improvements in the adaptation of currently used photogrammetric instruments for direct and automatic measurement; and for automatic recording of highway profile and cross-section dimensions for use in electronic methods of computing earthwork quantities. Investigations were made to evaluate and to improve aerial photographic processing and printing techniques.

Through review of specifications for aerial surveys contracts and technical consultations, services were furnished to engineers of municipalities, State highway departments, and other countries. An analysis was made of the current costs for aerial photography and photogrammetric engineering contract work to accomplish aerial surveys required for highway engineering purposes. Topographic maps were compiled photogrammetrically for highway design and preparation of detailed construction plans for highways in national forests and parks.

A six-month consultation service on aerial surveys was given and an aerial surveys training course was conducted for highway engineers in Peru. Courses of training in principles and uses of aerial surveys in the accomplishment of highway engineering were given to several groups of Public Roads engineers, and special on-the-job instruction and training were given to engineers from Ethiopia and Jamaica, and from field offices of Public Roads.

Highway Safety

THE CREATION of three new operating divisions during the fiscal year completed the basic organization of the Office of Highway Safety, established in Public Roads on December 6, 1961. In addition to the Driver Register Service, instituted in 1961, these divisions are:

Traffic operations, with traffic engineering, traffic accident records, and traffic laws and enforcement branches;

Planning and standards, with project evaluation, research correlation, and standards development branches; and

Educational services, with public traffic safety education, professional development programs, and educational publications and materials branches.

Appointments to key positions were made during the year and a technical staff was being recruited. A 2-year in- and out-service training program for recent college graduates interested in a career in highway safety was started, and the first three trainees were being selected.

Priority programs

THE OFFICE OF HIGHWAY SAFETY is responsible for a program of wide scope, but four critical areas were singled out for emphasis and pilot programs were planned

and started in these areas: Improvement of traffic accident records systems in the States; increased application and effectiveness of traffic engineering; improvement in driver-licensing records systems; and expansion of highway safety training programs. Significant progress was made in all areas, and work schedules were projected for the next 3 years.

Contracts were awarded during the year for special services and cooperative projects to advance highway safety. Among them was a pilot study of policing problems on controlled-access highways (including the Interstate System), conducted by the International Association of Chiefs of Police, to estimate manpower needs, effective policing techniques, and training requirements. This study will be helpful in the development of sound operational practices to promote safer use of high-speed, high-volume highways.

A study of the current status of accident records systems and means for improving the collection and analysis of traffic accident data was completed by the Northwestern University Traffic Institute, and provided the basis for Public Roads' work in defining immediate program goals in accident records activity.

Under a contract for analysis of motor-vehicle laws and ordinances, the National Committee on Uniform Traffic Laws and Ordinances initiated the *Traffic Laws Commentary*, a series of State-by-State analyses of safety provisions of motor-vehicle laws, and continued its work in promotion of the *Uniform Vehicle Code*.

In a project with the Traffic Court Program of the American Bar Association, a study was being made of the location, territorial and subject-matter jurisdiction, case load, and procedural activities of courts that prosecute traffic offenses on the Interstate Highway System.

The American Association of Motor Vehicle Administrators was aided in promoting greater uniformity of laws and regulations related to the examining, licensing, and control of drivers. Through this project expanded training opportunities were available for State driver-licensing personnel.

The Center for Safety Education, New York University, prepared an outline for a comprehensive textbook on traffic safety management designed to improve the technical competence of State and municipal traffic officials.

Public Roads joined with the U.S. Public Health Service, the National Safety Council, and the Insurance Institute for Highway Safety in sponsoring a critical survey and analysis of relevant social science literature related to mass communication of safety messages. Development of guidelines and standards for more effective traffic safety education activities were the objectives of this effort.

Public Roads and the Accident Prevention Division, U.S. Public Health Service, were jointly working on a study of emergency services, including medical services, on controlled-access highways, and continued to cooperate in exploring the field of driving simulation.

Participation in national and regional safety activities

THE INTERDEPARTMENTAL HIGHWAY SAFETY BOARD, activated in June 1962 under the chairmanship of the Secretary of Commerce, completed a report to the President on highway safety activities among Federal agencies. Goals set by the Board were being pursued by its working committee, headed by an executive officer from Public Roads and assisted by Public Roads specialists and representatives of the six other member agencies. Policy determinations and means for implementing new programs in highway safety were being given principal attention.

Public Roads also provided clerical staff to the President's Committee for Traffic Safety, and participated in activities of the Committee.

A national conference to give impetus to the adoption of the national standards for traffic control devices was convened in November 1962 by the President's Committee for Traffic Safety. This and 13 regional conferences previously held throughout the country brought widespread acceptance of the need for uniformity and modern standards for signs, signals, and markings on Federal-aid systems and on other streets and highways. Public Roads provided staff assistance to each of these conferences.

Contact with key traffic safety officials and organizations was maintained by Public Roads through participation in national and regional programs sponsored by the National Safety Council, International Association of Chiefs of Police, American Association of State Highway Officials, American Association of Motor Vehicle Administrators, American Bar Association, Institute of Traffic Engineers, and similar groups.

As a service to State and city officials concerned with highway safety, Public Roads prepared and distributed a directory of 26 national organizations which provide traffic safety services to States and cities.

National Driver Register Service

THE NATIONAL DRIVER REGISTER SERVICE is a voluntary, cooperative Federal-State driver record exchange on individuals whose driving privileges have been withdrawn for driving while intoxicated or for involvement in a traffic fatality. State motor-vehicle departments have placed the records of more than 325,000 problem drivers in the Driver Register during the 2 years of its operation. The Register now provides service to 44 States, the District of Columbia, and the U.S. Territories, which together request an average of 10,000 searches each day.

During fiscal year 1963, requests of the States for searches of the Register increased by 367 percent. On the second anniversary of the Register Service, the two-millionth search request was processed—just a little more than 6 months after the first millionth search request was received in December 1962. Searches have resulted in identification of 22,492 drivers with records in the Register, of whom 16,493 were identified during fiscal year 1963.

Research and Development

DURING THE YEAR Public Roads' activities in development were transferred to the Office of Research, which was renamed the Office of Research and Development. The Office undertook a revision in organizational structure, a reorientation of program activities, and redirection of objectives. The changes were accompanied by a major shift in program emphasis designed to foster intensive attack on significant problem areas, more immediate application of research findings, and their rapid translation into developed practices. Responsibility for program projects was divided among eight functional divisions.

The redirected effort, formalized as a "national highway research and development program," embraces determination of the future role of highway transportation and the facilities needed to attain maximum safety, economy, and capacity in the provision and operation of the highway system. Measures were being adopted to assure close coordination of the national program with the research and development programs of the States. In complementary areas of work, the facilities and capabilities of educational institutions and public and private research agencies were being used under contract, whenever feasible.

Within the scope of the national program, attention was being centered on the urgent problems in seven functional program areas regarded as of highest priority of need and importance. Studies being undertaken or sponsored by Public Roads

were addressed to the earliest possible solution of these problems. The national program's seven functional areas are:

1. Determination of the future role and type of facilities needed for highway transportation.
2. Reduction of highway accidents.
3. Increase in the capacity of urban roads and streets.
4. Development of methods of designing and evaluating highway pavements and structures.
5. Reduction of costs of drainage installations.
6. Reduction of construction, maintenance, and administration costs.
7. Improvement of the capability for conducting research and effecting rapid utilization of research results.

During the year, all States conducted research and development programs financed with the portion of their apportioned Federal-aid funds that is available for research and planning. Public Roads recognizes the need for the State programs to be responsive to individual State requirements. Within the framework of that need, progress was made in coordination of State programs with the national program and in guiding and assisting the States to direct their major efforts toward solution of widely recognized problems.

Five regional research and development conferences were conducted during the year, at Atlanta, Ga., San Francisco, Calif., Columbus, Ohio, Atlantic City, N.J., and Kansas City, Mo., to foster coordinated activity, thus improving the overall capability for conducting research among the Federal and State Governments and in cooperation with universities and both profit and nonprofit research and development agencies, and to develop more effective means for rapid utilization of results.

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

THE POOLED RESEARCH and development program known as "the national cooperative highway research program" was launched during the previous year by the American Association of State Highway Officials in cooperation with the Bureau of Public Roads and the Highway Research Board. The program is financed by a majority of the States from the part of apportioned Federal-aid funds which may be used for planning and research. The States created this pooled program for needed research on highway problems of nationwide concern which are beyond the capabilities of the individual States. The program for fiscal year 1963 included approved projects in six major areas, estimated to require about \$1.6 million of the \$2.2 million annually available. At year's end the Highway Research Board, which administers the program, had placed virtually all projects under contract to universities and other research agencies.

The pooled-fund program for fiscal year 1964 had been fully formulated through the AASHO and HRB committees, on which Public Roads is represented, and was at the point of final approval at the beginning of the fiscal year. The new program provided for continuation of the projects in the 1963 program and added 22 new projects in 12 agreed-upon areas.

MOTOR-VEHICLE SIZE AND WEIGHT STUDY

PUBLIC ROADS HAS BEEN ENGAGED for the past several years in a study, requested by Congress, leading to recommendations with respect to the maximum desirable sizes and weights for vehicles operated on the Federal-aid highway systems. The work has been pursued in close cooperation with the American Association of State Highway Officials, which was concurrently modernizing its 1946 policy governing weights and dimensions of motor vehicles. In de-

veloping recommendations, Public Roads has used the findings of the AASHO Road Test and the results of extended field investigations of pavement serviceability and both road and bridge capability. Studies of the long-time trends in the weights and dimensions of vehicles encountered in normal traffic have been considered in relation to the highway requirements for safe accommodation of vehicles of varied size and weight. The effects of loads of varied magnitude and application frequency on the survival life of road pavements and bridges have been established in terms of their highway cost of accommodation and considered in relation to vehicle operating cost. The needs and requirements for the realization of maximum economy in the haulage of the Nation's goods have been regarded as a governing factor in the study including the effect of other media of transportation. At year's end a report of the study was near completion.

TRAFFIC SYSTEMS RESEARCH

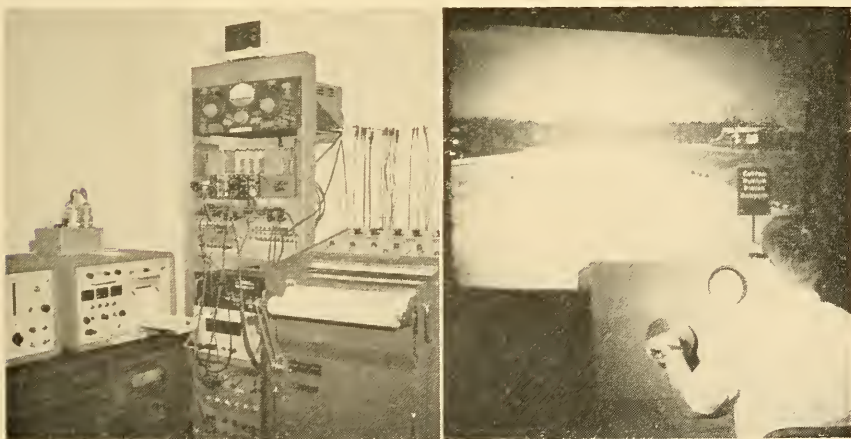
Individual transportation systems research

TO EXAMINE FUTURE NEEDS for high-quality individual transportation, Public Roads planned a long-range research and development program in individual transportation systems which will seek to define and evaluate a range of alternative individual transportation system concepts that might offer substantial improvements over existing highway transportation. The first phase of the program will be a systems analysis of individual transportation, for which specifications were completed.

Human factors research

LABORATORY EXPERIMENTATION, using a basic driving simulation facility, was conducted to ascertain the effects on steering control and searching out roadway features such as destination signs, when a driver divides his time between the two driving sub-tasks. The findings indicate that while performance is generally degraded on both tasks, the operator will maintain stable steering control at the expense of recognizing roadside elements.

Cornell Aeronautical Laboratory was continuing research for Public Roads on the problem of determining the requirements of part-task driving simulators.



With this driving simulation equipment, studies were made of drivers' performance in steering and looking for a destination sign. At right, the driver operates the controls; at left, the electronic generating and recording equipment.

A methodological study developed an experimental procedure for establishing the relative resistance to stress of driving part-tasks which may be simulated in the laboratory. Through field research an attempt was made to explore the feasibility of using verbal reports and eye and head movement records to develop a computer model of driver decision making. It is expected that the development of the model and its programming and empirical validation will lead to an objective and detailed description of driver information seeking, decision making, and control processes.

Research was completed on a test track study of the effects of various configurations of road markings on steering control behavior. Preliminary analysis showed that a driver may use one of three analytic operations to detect deviations in his tracking of the roadway.

Another test track study, using an electronic instrument that continuously tracks the path of a vehicle, was initiated to delineate the effects on a driver's steering behavior of medial friction, which is defined as the influence of one vehicle on another when they proceed toward each other from opposite directions, each keeping to its appropriate lane of travel.

A laboratory study of the maintenance of headway in steady-state car following was initiated, to determine the instabilities and variability of headway in car following which are a result of an area of uncertainty in the human operator's perceptual system. In addition, the simulated car following situation sought to establish the sensitivity of the following driver to lead car accelerations and decelerations.

An investigation on vehicular headway, completed for Public Roads by the Applied Psychology Corporation, showed that among the various driver characteristics and environmental factors studied only vehicle speed significantly influenced following-distance behavior.

A cooperative research project was undertaken by BioTechnology, Inc., to determine the visual cues used by a driver at night in the detection of overtaking a vehicle ahead, or in the determination that a vehicle is stopped.

A perceptual theory of the behavior of drivers constrained to following in traffic was developed that predicts much of the current data in car following and traffic flow research and also explains the high variability obtained in present highway capacity measures. The theory suggests that current approaches to increasing capacity have fundamental limitations because of the driving task; and, consequently, rather radical design changes will be required to obtain significant gains.

Research was undertaken to structure, in mathematical terms, the perceptual characteristics of the driving environment, thereby permitting an ordering of the perceptual dimensions used by drivers in steering control.

A field study was completed on a rural freeway to determine the generation of driver tension, as measured by the galvanic skin response test, at vehicle speeds ranging from 35 to 70 miles per hour. The results offered evidence that there is a tension, as found by previous research, operating under different stress loads which is controlled by variations in travel speed.

A test driving course was used to determine what effect the degree of background reflectorization, which causes a sign to seem to glow when illuminated by automobile headlamps, has on driver performance in obtaining the information he requires from a guide sign.

Traffic performance research

COMPLETED DURING THE YEAR was a comprehensive report on capacities and characteristics of ramp-freeway connections, based on detailed studies at 230 such connections. It represents the first known attempt to develop generally

applicable mathematical procedures for use in predicting the capacities of ramp-freeway junctions in cities of all sizes.

Detailed studies of the characteristics of bus operations on freeways, conducted in several cities, were designed to predict the theoretical capacities of all-bus lanes on freeways (no such facilities currently being in operation) and to discover the effects of buses in mixed freeway traffic.

A second "after" study was conducted on Wisconsin Avenue, Washington, D.C., to further validate the theoretical findings of the original study on increasing the traffic-carrying capability of urban arterial streets, conducted in 1959.

In a study of computer simulation of freeway traffic sponsored at Midwest Research Institute, a new, more realistic program was developed and applied to the problem of optimum spacing between interchanges. A project was sponsored at Michigan State University to study traffic patterns between interchanges spaced at various distances apart. This study, utilizing new aerial photography techniques, will provide validation data for the Midwest Research Institute undertaking as well as providing independently useful results.

Special electronic equipment developed and operated by Public Roads to measure traffic flow characteristics was used extensively during the year in six States, both to test and evaluate other equipment and to measure the effect of various traffic control and roadway features on traffic flow, in terms of volumes, speeds, spacings, and lane distributions.

Development and evaluation of special freeway control equipment continued at the John Lodge Freeway television surveillance project in Detroit, with emphasis on evaluation of lane control signals and ramp closure equipment. Using the surveillance and control equipment, experiments were begun on modifying the freeway traffic flow and determining overall effects on the freeway and surrounding streets.

Instrumentation

During the year Public Roads designed and built another unit of the traffic impedance analyzer, an analog computer for human factors research, and a simulator for traffic volume counter evaluation work. Electronic instruments were completed for the accumulative recording of strains in bridge members, the nondestructive determination of pavement thickness by sonic techniques, and the determination of curing time to cracking of a standard concrete test ring. Advances were made in the areas of vehicle detector research, automotive fuel-meter design, and a transistorized traffic impedance analyzer.

Motor-vehicle performance research

A STUDY TO ESTABLISH a value of time saved to commercial motor vehicles through use of improved highways was completed for Public Roads by Texas Transportation Institute. The investigators followed the general hypothesis that the operators of commercial vehicles will absorb the benefits of time saved through added productive use of manpower and equipment to create a proportionate increase in operating revenues. Dollar values were assigned to time saved through use of improved highways for different types of carriers and different types of commercial vehicles.

Through a series of scale-model tests, information was developed on the turning path requirements for the larger sizes and configurations of commercial vehicles.

A study was completed during the year of weights and dimensions of loaded and empty commercial motor vehicles providing basic information on the sizes and types of cargo bodies used to transport various loads. The study gives a better understanding of highway freight movement capabilities under both

normal and emergency situations, and reflects the trucking industry's usage of different sizes and weights of vehicles as influenced by State regulations.

A study was underway to predict the future demand for highway freight transportation in terms of shipping densities of commodities to be hauled. Commodities produced in 1960 were grouped by density and related to the number and sizes of vehicles necessary to move the tonnages from production to consumption points. A new Bureau of the Budget code was used to classify the commodities.

Highway accident research

A TECHNICAL REPORT on the accident involvement study undertaken in cooperation with 11 State highway departments was completed. It was shown that, on main rural highways, the chance of being involved in an accident was least when traveling at the average speed of all traffic and greatest at low speeds and at very high speeds. However, when an accident occurred, its severity increased with speed, especially at speeds exceeding 60 miles per hour. Passenger-car drivers under age 25 and over age 65 had much higher involvement rates than middle-aged drivers. Beyond age 35, female drivers of passenger cars had higher accident involvement rates than male drivers, but under age 35 there were less consistent differences.

A progress report was completed on the Interstate System accident study, undertaken with 16 State highway departments, in which more than 1,000 miles of completed Interstate highway sections were compared with nearby older existing highways.

A report was completed on a cooperative study of accident costs and frequencies of Illinois motorists. The study showed that direct cost of accidents to drivers of passenger cars was 0.97 cent per vehicle-mile of travel; that direct accident costs in urban areas were nearly twice those found in rural areas; and that actual damage to the vehicle and other property accounted for 60 percent of the total direct accident costs.

ECONOMIC RESEARCH

Motor-vehicle ownership and use

A STUDY OF THE AUTOMOBILE in the American family life was completed during the year, based on Statewide motor-vehicle-use studies made by 24 State highway departments and nationwide studies of automobile use made by the Census Bureau for Public Roads. The study covers subjects such as density and distribution of automobile ownership and licensed operators, and characteristics of family automobile use, including length of trips, purposes of travel, and car occupancy.

Highway financing research

RESEARCH IN PROBLEMS of highway finance continued. Developments during the year included preparation of a discussion of recent applications of the earnings-credit and relative-use methods of highway cost allocation; near completion of a study of various methods of allocating highway costs and distributing the income received from the taxation of highway users; initiation, in cooperation with the AASHO Committee on Highway Finance and the Highway Research Board Committee on Highway Taxation and Finance, of analyses of State expenditures for maintenance of completed segments of the Interstate System; and inception at the University of Mississippi of a contract research study of special taxes on motor carriers and of other so-called "third-structure" taxes on highway users and their effects on commercial highway transportation. Technical assistance was given to eight States in connection with long-range highway finance studies.

Highway cost and investment research

SERVICE-LIFE ANALYSES of primary rural highways for various surface types were continued. Analysis of data from 26 States and Puerto Rico on mileages of various types built each year, mileages retired, and methods of retirement, will reflect the effects of the stepped-up highway program on the service lives of highways. These data, when fully summarized, will supplement previous reports on this subject made in 1940, 1948, and 1956.

Work was undertaken to determine vehicle operating costs and construction costs for highway designs based on different levels of traffic volume for various weight classes.

Engineering economy research

A BASIC STUDY of the methods and applications of the principles of engineering economy to highway improvements was continued. Two reports were published and a summarizing final report was being prepared, including case studies of various types of highway improvements.

Research was continued on the subject of value and cost of traveltime to the occupants of passenger cars. A study of the costs incurred on detours by road users, State highway departments, and contractors was initiated. A study was begun to develop analytical procedures for determining the most economical crossing of flood plains. Research was continued on the factors that make up the benefit-cost ratio which is applied in evaluating the economy of alternate highway improvements.

Economic consequences of highway improvements

IN THE PROGRAM evaluating the economic consequences of highway improvements, studies were underway on the effects of highway improvements on interchanges, land use, land values, and central business districts. Completion of 10 economic impact studies during the year brought the total number of such studies completed to more than 125. At the end of the year, 52 studies were in progress in 34 States.

A study of the Capital Beltway in Virginia showed that its influence was apparently present even before the start of construction, since land values adjoining the right-of-way increased at a more rapid rate than land values in the central business district.

A study of the relationship between the Connecticut Turnpike and the labor market was based on equi-probable ellipses centered on two plants to which workers commuted. The study indicated that for many workers transportation time was more important than distance, and that high-speed highways were important factors in the expansion of labor markets.

A study of a bypass in California, which diverted 45 percent of total traffic around the town, showed that it had an adverse effect on only one category of business, cafes not serving liquor. All other retail businesses, after a temporary setback, returned to normal conditions or better.

A forecasting report, which is part of a three-phase Virginia study directed toward the development of forecasting procedures useful in highway administration, was completed. It concentrates on commonly used methods, to provide State highway departments with a handbook of procedures that will encourage the development of more accurate predictive techniques.

Right-of-way and land-use studies

WITH SEVERAL ADDITIONAL STUDIES INITIATED, severance damage research was underway in 43 States, and 75 narrative severance damage reports had been completed. During the year nearly 600 case studies were submitted on forms or punch cards by 25 States for inclusion in the national "bank" of severance dam-

age studies, bringing the bank total to 900 cases. Analysis of these cases was providing interesting and significant findings which will be of considerable value to right-of-way personnel, particularly appraisers.

Findings of a detailed Kentucky study on severance damage along Interstate Route 64 agreed with conclusions of other economic studies—that homes were being constructed along the right-of-way; that apprehensions of owners about the highway diminish with time; and that adjoining property owners were anxious to buy remainder parcels.

In right-of-way research, a right-of-way practices study analyzed procedures in 10 State highway departments. Another study traced the history and examined the rationale of special and general benefits with particular reference to highway takings; the study examined current legal theories on the use of benefit offsets, and noted a trend to consider and offset all benefits in determining awards in condemnation cases.

A study in cooperation with the Highway Research Board of highway-public utility liaison practices sought to determine if the proper procedural relationship between the highway agencies and the public utility groups would facilitate more efficient and timely relocation and adjustment of public utility facilities when these are involved in highway improvements.

A real estate appraisal colloquium, sponsored by Public Roads at the University of Wisconsin, provided an opportunity for the practitioner, public official, and professor to join in the identification and evaluation of current issues in appraisal theory and gaps in appraisal methodology.

Interchange and land-use control studies were in progress in nine States, attempting to determine the kinds and amounts of development that are compatible with properly functioning interchanges and seeking to develop appropriate land-use controls to preserve the public and private investment at these areas. The studies include consideration of such matters as models of land-use developments and related traffic flows, evaluation of available land-use controls, and land supply and demand at highway interchanges, including land consumption by major industry classifications. As an example, a study completed in Kansas determined that in Kansas the basic authority for comprehensive transportation and land-use planning is sufficient and the procedures are workable where there is a will to make these procedures work. This conclusion agreed generally with tentative findings from similar studies in Massachusetts and Georgia.

Highway laws research

PUBLIC ROADS CONTINUED its cooperation with the States in studies for highway laws improvement, working with individual States on code revision. Several additional States initiated highway laws research projects during the year, bringing the total to 15. The value of liaison between the laws study staff and officials of the State highway department and the State legislature was evidenced during the year by enactment by the Utah State Legislature of a modern highway code resulting from a 2-year highway planning survey study, and by the favorable reception which the West Virginia State Legislature gave findings from the laws study in that State.

A variety of highway legal problems were being studied under direct research contracts, including a study of problems of inverse condemnation in the construction of highways, a study of control devices available under the police power of reservation of rights-of-way in advance of acquisition, and a study on legal and economic aspects of controlling highway access.

HYDRAULIC RESEARCH

THREE NEW STUDIES were started on the problems of runoff from small watersheds. Two studies seek to provide the highway engineer with procedures

for determining reliable estimates of peak rates of runoff at stream crossings located in areas where stream-flow measurements are non-existent. The third study attempts to devise means to predict the rise and fall of a stream with respect to time by use of statistical sampling procedures.

The effects of all commonly used variations of box culvert design upon the capacity of the culvert have been established by hydraulic model tests, and the most simple designs for low-cost improvement of the capacity of these culverts have been determined. More complex designs for extremely high capacity culverts were under investigation.

The investigation of hydraulic resistance of a particular type of corrugated metal culvert providing sufficient structural strength to support high fills was completed, making accurate engineering data available for the first time for determination of flow discharge capacity of culverts of this type.

Improved hydraulic design curves for a particular type of depressed curb-opening inlet were developed during the year. The use of these curves in design will increase the efficiency and economy of urban storm drains.

MATERIALS AND STRUCTURAL RESEARCH

Soils and foundations research

PUBLIC ROADS' COOPERATIVE EVALUATION of nuclear apparatus for measuring the moisture content and density of soils was continued in 5 States and started in 5 additional States. Colorado permitted nuclear devices to be used by inspectors in construction control of earthwork, as a result of favorable evaluation results. Public Roads and some States found that, for the nuclear device tests, variable chemical composition of the tested soils requires that multiple calibration curves be prepared for density measurement. Oklahoma was evaluating a mobile unit for measuring the moisture and density of subgrades and base courses.

Cooperative work pointed toward the development of sonic apparatus for rapid measurement of moisture content and density of soils was continued at Vanderbilt University and evaluation tests were made with a mechanical impedance device.

Work was continued in most of the States in developing soil and materials maps and reports for use in highway location and design. Thirty-five State highway departments assisted Public Roads in developing engineering information for soil survey reports. The materials inventory and materials mapping projects were completed in West Virginia, continued in 11 other States and Puerto Rico, and started in Kansas.

Public Roads collaborated with the Highway Research Board in an extensive report, based on a literature search, on factors influencing compaction test results.

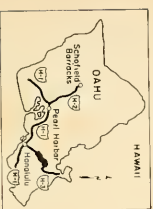
In the search for promising chemicals for stabilizing soil materials, cooperative agreements were made with two chemical companies which were doing research on this subject in their own laboratories. Fifteen concerns are now engaged in this program.

The States showed renewed interest in the use of asphalts for stabilization by including studies in their cooperative research.

Because of the increasing shortages of good material for base courses, Colorado, Montana, and Wisconsin initiated studies of the degradation of sub-standard aggregates and of methods for their upgrading to produce suitable materials.

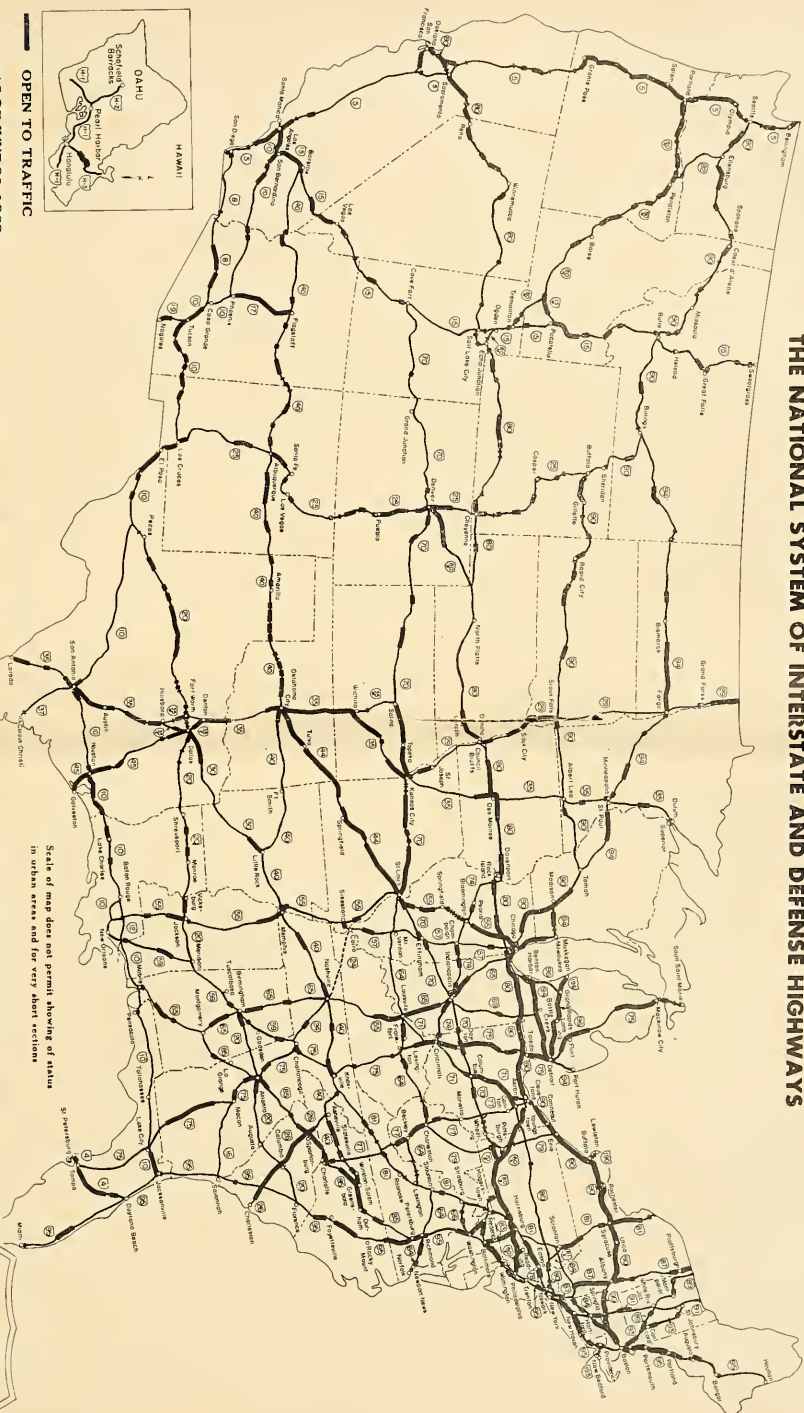
Growing concern for the stability of cut slopes and embankments, which involve extensive quantities of earth and rock in modern highway construction,

THE NATIONAL SYSTEM OF INTERSTATE AND DEFENSE HIGHWAYS



OPEN TO TRAFFIC

AS OF JUNE 30, 1963



Preliminary Status
or Not Yet in Progress
9,571 Miles

Engineering and Right-of-Way
in Progress
11,308 Miles

Under
Construction
5,292 Miles

Open to Traffic
14,829 Miles

31,429 Miles

INTERSTATE

TOTAL
41,000
MILES

has resulted in research studies on landslides and rockfall in cooperation with Arkansas, Kentucky, Montana, North Carolina, and Washington. The experience in Washington in their rockfall study has been recorded on movie film. In New York a computer program for the slope stability analysis of an embankment over several layers of different materials was completed.

Settlement of bridges on pile foundations was the basis for the continuing cooperative studies at the University of California, the Georgia Institute of Technology, and in North Dakota for rational methods for the design of pile foundations. Settlement of embankments was the basis for studies concerning the effects of vibration on soil properties at New Mexico State University, the causes of shear strength in silty deposits at the University of Rhode Island, in situ lime stabilization of soils at depth at Louisiana State University, and settlement studies in Louisiana, Maine, Minnesota, and New York.

Problems with swelling subgrade soils prompted the initiation of cooperative studies in Arkansas and Colorado on the soils of these States.

Bituminous materials and pavement research

PUBLIC ROADS SUCCESSFULLY SPONSORED changes in national and State specifications for liquid asphalt, establishing new grades based on kinematic viscosity at 140° F. Progress was made toward the measurement of the consistency of liquid asphalts in fundamental units. A report showing the relation of absolute viscosity to the strength of paving mixtures was published. Apparatus for measuring fundamental viscosity below 40° F. was developed.

A report published on the properties of a commercially produced coal-modified binder indicated that additional research was necessary for the development of a satisfactory binder of this type.

Studies were started for implementing quality control procedures and specifications for bituminous materials based on statistical concepts.

A statistical study of the repeatability and reproducibility of the immersion-compression test for bituminous mixtures was reported. An improved device for measuring the air permeability of compacted bituminous mixtures was developed.

An improved aggregate gradation chart based on the plotting of sieve sizes raised to the 0.45 power was devised and used for establishing improved gradation specifications for Federal road construction and was proposed for use in the AASHO guide specifications which were in the process of development.

Cooperative projects to develop information on the structural behavior and design of flexible pavements were initiated in Illinois, Indiana, Ohio, Texas, and Washington. A laboratory study in Louisiana showed a good correlation between soil strength tests using the stabilometer and Texas triaxial procedures. These results were correlated with the AASHO soil classification group index values.

Cooperative studies to translate the results of the AASHO Road Test to local environmental and soil conditions were conducted in nine States. Selected pavements in 10 States were observed to correlate wheel load and pavement deflection with pavement design and performance. This work has been useful in establishing load restrictions during the critical spring season, has related cracking with fatigue caused by repeated excessive deflections, indicated the importance of developing strength in the road-bed soil by stabilization or other means, and established the value of improved compaction and stabilization of the base and subbase.

Portland cement concrete pavement research

REPORTS WERE PREPARED on the effects of chemical composition of cement, various admixtures such as water-reducing retarders, silicones, and latexes,

and various surface coatings such as silicones, linseed oil, and curing materials, on the durability of concrete based on outdoor weathering and scaling tests.

A report comparing the uniformity of results obtained with the indirect tensile splitting test and both the compressive and flexural tests of concrete was published, providing a basis for development of an ASTM method.

An investigation of the extent and causes of deterioration of concrete bridge decks was in progress in cooperation with the Portland Cement Association and 10 State highway departments. An interim report of a detailed study of the causes for deterioration of bridge decks in Kansas was prepared.

Cooperative studies relating to concrete pavements were underway in 20 States. Translation of the AASHO Road Test results was continued or initiated by Alabama, Delaware, Illinois, Louisiana, Maryland, Missouri, New York, North Carolina, and Virginia. Investigations of continuously reinforced concrete pavements were continued or initiated in Illinois, Maryland, Mississippi, Pennsylvania, South Dakota, and Texas. Sixteen States have built one or more of these so-called jointless pavements, which now total approximately 500 equivalent 2-lane miles.

Cooperative studies also included moving load tests on an experimental prestressed pavement, encroachment of the pavement on structures, performance of joints, corrosion of load-transfer devices, cause and prevention of blow-ups and erratic cracking, evaluation of terminal anchorages, performance of subbases, and the effects of dynamic loading.

Work was continued on evaluation and refinement of the ultrasonic pulse-technique apparatus which was built by Public Roads for nondestructive measurement of the thickness of concrete pavements.

A laboratory study of the structural performance of load-transfer devices under repetitive loading was initiated. This study supplements previously reported research on plain round dowels, and is designed to provide comparative performance data on round dowels, elliptical dowels, and several proprietary devices.

Pavement surface characteristics

COOPERATIVE RESEARCH on the riding quality of pavements was continued in six States. Public Roads' roughometer participated in the road roughness correlation study held at Sioux Falls, S. Dak., in August 1962. Twenty-three States now own BPR roughometers. Arrangements were made for the manufacture of CHLOE profilometers for 18 State highway departments. The longitudinal profilometer used on the AASHO Road Test was being reactivated for the roughness correlation study to be held at Purdue University in July 1963.

Public Roads' new skid resistance trailer was service tested and its performance was evaluated comparatively with skid measuring devices developed by several other agencies during the skid correlation study at Tappahannock, Va., in August 1962. Analysis of the resulting data indicated that the BPR skid trailer and those of four other agencies showed excellent agreement. A 30-minute color movie of this test series was prepared and is available for loan.

Bridge research

THE DYNAMIC TEST STUDIES on bridges, conducted by Public Roads personnel and equipment, were being correlated with the overall investigation recommended by the bridge panel of the AASHO Road Test. Reports of studies in Missouri, Virginia, and Texas were being prepared. Additional tests were made in Virginia and tests were made on steel girder prestressed concrete bridges in Mary-

land. Instrumentation and development of special procedures for bridge research to be done during the summer of 1963 in Virginia, Texas, and New York was completed. The Virginia bridge, involving the use of aluminum in stressed-skin structural design with a composite deck, has given some 2 years of satisfactory service. The bridges in Texas and New York, of concrete with a new type high-strength reinforcing steel, were nearing completion.

Wind tunnel studies made during the year were concerned with the correlation of test results obtained with Public Roads' own wind tunnel and those obtained earlier at the University of Washington, using a model of the Golden Gate Bridge. The development of an electronic wind-measuring device for the extensive investigation of wind conditions over a suspension bridge site continued at the University of Washington.

Research in cooperation with the University of Illinois on welding and on fatigue in beam specimens continued to shed light on problems in the use of welding in steel and reinforced concrete bridges but there was a backlog of problems incident in part to the advent of new steels for structures. The good correlation of the AASHO bridge tests with the Illinois laboratory tests on fatigue raised hopes for practical applications which call for further tests on the influence of residual stress and of design details.

Cooperative research on riveted and bolted structural joints at the University of Illinois and Lehigh University focused on solving specific questions growing out of recent research and its application in the revision of design and fabrication specifications.

Cooperative research in a dozen States on the insulation of the underside of bridge decks was beginning to show the varied effectiveness of this treatment on the freeze and thaw cycles on bridges. Another winter or two of observation may give a clearer indication of the conditions under which insulation will yield net benefits.

Comprehensive field studies in Michigan into the correlation of pile load capacity with energy use and dissipation for different types of hammers, different types of piles, and different soil conditions were completed and the extensive data taken were being analyzed by computer.

Outdoor exposure tests of rust-inhibitive paints established the importance of a minimum film thickness requirement and the superiority of basic lead silico-chromate paints over standard types. Research on abrasion-resistant bridge paints for Alaska showed the superiority of rubber-type coatings for resisting the abrasive force of wind-borne sand and ice.

Guardrail and bridge rail research

A PRELIMINARY ANALYSIS was made under contract at the Cornell Aeronautical Laboratory to explore optimum characteristics for bridge railings. Subsequently, full-scale dynamic tests were made on a welded steel rail used as standard in New York and on a welded steel rail based upon a revised specification for bridge railing prepared by Public Roads for consideration of the AASHO Committee on Bridges and Structures. A comprehensive cooperative report was prepared by the New York State Department of Public Works based on the results of a combined mathematical analysis and full-scale dynamic tests of three general classes of highway barriers.

Culvert pipe research

COOPERATIVE RESEARCH was underway with a number of States to study the corrosion resistance and load carrying capacity of aluminum corrugated metal pipe culverts. Studies were also underway on the effect of various heights of fill

on the load-bearing characteristics of concrete pipe. The imperfect trench method of culvert installation was under cooperative study in several States.

Instrumentation

THE RESEARCH WORK of the Public Roads laboratories was supported and facilitated by the work of the instrument-design and instrument-shop units which, in cooperation with the research staff, produced 23 new designs and 112 engineering drawings for necessary new test devices or improvements of existing devices and instruments. These new or improved instruments have been fabricated in prototype by Public Roads personnel.

DEVELOPMENTS IN ELECTRONICS

CONSIDERABLE PROGRESS was made in advancing the use of the critical path method of project planning, scheduling, and control for highway operations in the State highway departments. Panel discussions on the technique and its application in the highway field were arranged and conducted at the AASHTO Committee on Electronics regional conferences at New Orleans in September 1962 and at Chicago in April 1963. In addition, consultation and assistance were provided to a number of States. The technique had been adopted by four States and a number of others were engaged in studies preliminary to adoption. Studies were initiated during the year to explore the application of the critical path method to various phases of preconstruction operations.

A comprehensive study was undertaken of the application of electronic computers to hydraulic analyses involved in the design of highway drainage structures. Computer programs were developed for hydraulic analysis of circular culverts and of pipe-arch culverts. Computer programs for hydraulic analysis of box culverts and for bridge backwater computations were nearing completion.

Work continued on the development, in cooperation with the District of Columbia Department of Highways and Traffic, of an electronic computer procedure for the structural analysis of curved girder bridges. Because of the complexity of the mathematical computations involved, such analyses become economically feasible only with the use of an electronic computer.

Work was resumed on the development of an improved photogrammetric instrument embodying maximum flexibility in a modular design employing a color cathode-ray tube stereoviewing and electro-mechanical projection system. Such flexibility will permit the system to be readily adapted to specific uses in the areas of orthographic plotting, orthophotography, and digitization of photographic detail for electronic computation in highway location and design, contouring, etc. It will also permit multiple and remote viewing of the three-dimensional stereo-projection of the aerial photographs.

In cooperation with the Massachusetts Department of Public Works, a project was initiated on the application of "image processing" techniques to highway location, design, and traffic studies. This involves the application of a new concept in which aerial photographs were scanned electronically to digitize, at extremely high speed, the information they contain for purposes of mapping or electronic computation, either at remote points or at the site.

A project was initiated for the development of an information storage and retrieval system covering the highway construction specifications of the 50 States, the District of Columbia, Puerto Rico, and the Bureau of Public Roads. This will provide a means for facilitating the upgrading of highway construction specifications through simplification and standardization, and for evaluation of current acceptance criteria.

PRODUCTION DEVELOPMENT

PRODUCTION STUDIES of construction operations were completed on 51 projects during the year, with 44 junior engineers participating as assignments in the Public Roads training program.

Special emphasis was placed on studies involving high-type paving. Covered in the bituminous paving studies were thermal efficiency of aggregate dryers, rolling methods and procedures, and correlation of the use of rapid nondestructive testing devices, such as permeability apparatus and nuclear gages, with conventional density testing equipment.

Production studies for portland cement concrete paving equipment covered both central plant mixers and multi-compartment pavers, on which the experimental use of a device for recording mixing time was made. Of the 12 studies of plant mixing productivity, 2 involved the new turbine or rotary type mixers. Mixing time studies were conducted simultaneously with the production studies, with the objective of checking product quality and developing data for realistic mixing time requirements for these mixers. While these studies were not of sufficient scope to establish mixing requirements, it was apparent that the method used to charge the mixer will affect the time necessary to develop a mix of uniform consistency of the strength desired.

In the earthmoving field, the 16 productivity studies conducted included such prime movers as hauling scrapers and power shovels.

Public Roads continued to encourage the development of new and improved equipment for highway construction, maintenance, and operations, cooperating with industry and participating in the activities of road-building agencies, including the joint subcommittees on highway construction and maintenance equipment of the American Association of State Highway Officials and the American Roadbuilders' Association.

Continuing progress was made with State highway departments in eliminating restrictive and inapplicable equipment requirements in their construction specifications. Specific progress was made in reducing the mixing time for portland cement concrete produced in central mixing plants without sacrificing product quality. An increasing number of States were employing a mixing time of 90 seconds or less, in place of a mixing time based on mixer drum size which would provide for a mixing time as high as 165 seconds for the commonly used 8 cubic yard stationary mixer. Some progress was also made in developing more realistic compaction equipment requirements for soils, base courses, and bituminous concrete pavements.

Highway Improvements Under Direct Supervision of Public Roads

UNDER EXISTING LEGISLATION, the Bureau of Public Roads receives and directly administers annual appropriations for major highways through national forests, and performs highway engineering and construction services for other Federal agencies as required by law and as may be requested for specific projects. The principal agencies receiving direct appropriations for the construction and maintenance of roads and requesting assistance from Public Roads include the Departments of Agriculture, Defense, and Interior. In this general program for highway and bridge construction Public Roads makes surveys, prepares plans and specifications, advertises for bids, and supervises the construction of the projects.

During fiscal year 1963, improvements under the direct supervision of Public Roads were completed on 117 projects, involving 675 miles and Federal funds totaling approximately \$58 million. A total of 141 new contracts was awarded during the year, involving \$62.7 million and 769 miles. At the close of the

year, improvements estimated to cost \$115 million were under contract for construction on 1,110 miles. Additional work on 556 miles estimated to cost \$66.7 million was either in the programed, plans-approved, or advertised stage. This active and proposed work involving a total estimated cost of \$182 million is reported by program in the following tabulation:

Forest highways-----	\$76, 624, 772
Accelerated Public Works program-----	3, 820, 905
Parkways -----	50, 318, 844
Park roads and trails-----	31, 879, 661
Bureau of Land Management roads-----	7, 347, 326
Department of Defense, access roads-----	1, 832, 000
Federal-aid in Alaska, Idaho, Montana, and Oregon for jointly financed projects ¹ -----	2, 663, 901
Public lands highways-----	1, 399, 704
Forest development roads-----	1, 552, 839
Emergency relief, Montana earthquake area-----	2, 285, 000
Pentagon Building road network-----	984, 498
Washington National Airport ² -----	959, 652
<hr/>	
Total -----	181, 669, 102

¹ The Federal-aid funds reported here for construction under Public Roads supervision include funds authorized under Section 3(a) of the Federal-Aid Highway Act of 1958, and also include funds authorized under special Alaska legislation.

² Two structures over George Washington Memorial Parkway, adjacent to airport.

A brief coverage of some significant and typical activities under the direct supervision of Public Roads is presented in the following paragraphs.

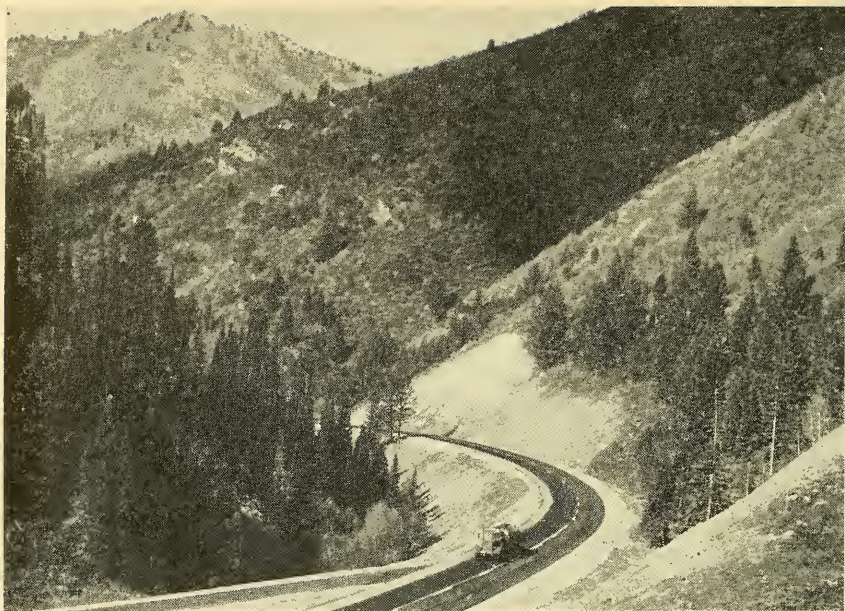
Forest highways

THE FOREST HIGHWAY SYSTEM, composed of main and secondary roads within or adjacent to the national forests, is located in 40 States and Puerto Rico. At the close of the fiscal year the system had a total length of 25,514 miles, of which 51 percent is in 13 Western States. Although the system is not wholly connected, its routes are the principal means of transportation into and through the national forest areas. Table 18 of the appendix shows, by forest road class, the system mileage in each State.

In the West where construction operations on the forest highway system are financed largely by forest highway funds, such construction is generally administered directly by Public Roads. In the East where the apportionment of forest highway funds to any one State is relatively small and is generally supplemented by Federal-aid, State, and/or local funds, the construction is usually administered by the State highway departments.

During the fiscal year, 51 forest highway projects were completed under the direct supervision of Public Roads, involving 352 miles and \$27 million of Federal funds. At the close of the year 86 other projects, similarly supervised, were under contract for improvements on 564 miles, involving \$52 million of Federal funds. Some of the improvements completed during the year are briefly described in the following paragraphs.

Paradise cut-off highway in Montana.—During the year construction was completed on a 445-foot concrete girder bridge over the Clark Fork River on State Secondary Route 461 between St. Regis on U.S. 10 and Paradise on U.S. 10-A in northwestern Montana. This bridge replaces the last major ferryboat on the river and makes possible year-round traffic on the route, which previously was closed about four months each winter when the ferry was inoperative due to ice on the river. During these periods it was necessary to travel more



Forest highway funds built this scenic section of Utah State Route 152 in the Wasatch National Forest, near Salt Lake City. (A portion of the old road appears at the left.)

than 100 miles between St. Regis and Paradise instead of the usual 25 miles. The new bridge is thus of great benefit both to the local people and to through traffic. It will also generate considerable economic benefits to the area's timber industry, agriculture and stockraising, and recreational activities.

Belknap Springs highway in Oregon.—An important project completed during the year was paving of the 20-mile Clear Lake-Belknap Springs section of forest highway, opening an all-weather route from eastern Oregon to the Upper Willamette Valley. This highway parallels the north-south Cascade summit and has been approved as the relocation of U.S. 126. More than \$3 million has been spent since 1954 in changing the old rough trail to a 24-foot-wide scenic highway which can be safely traveled at 55 miles an hour.

St. Helens highway in Washington.—Completion of a 4-mile section of this forest highway in the southwestern portion of the State provides a modern all-weather route to the Gifford Pinchot National Forest and to the recreational area near Mt. St. Helens. This section replaces a narrow dirt road usable only during good weather. One of the immediate direct benefits of this new highway will be the removal of several million board feet of insect-damaged timber heretofore inaccessible. Anticipated benefits to the area include annual timber sales of 25 to 30 million board feet, and development of recreational facilities attracting 150,000 people each year.

Accelerated Public Works program

PUBLIC ROADS WAS RESPONSIBLE to the Area Redevelopment Administration for the administration of the entire \$15 million program for highway improvements made possible by the Public Works Acceleration Act, approved September 14, 1962. The purpose of the act was to assist those areas in the Nation which were burdened by high rates of unemployment by providing immediate employ-

ment opportunities and enhancing economic growth in these areas. Public Roads administered the allocation of funds to approved eligible projects in accordance with ARA instructions as to eligible areas, maximum limitation to any one project, local labor provisions, etc., regardless of whether actual construction was to be performed under the direct supervision of Public Roads or under State supervision.

During the year, the entire \$15 million available was programed for construction on 431 miles of forest highways in 28 States and in Puerto Rico, 3.4 miles of defense access highway in Michigan, and 12.5 miles of Federal public lands highways in Maine and New Mexico. A total of 78 contracts were awarded to accomplish this work, of which 75 were for construction on the forest highway system and involved \$14.3 million. Projects per State under this program ranged from one to six. Illinois, Kentucky, and West Virginia each had six.

As relatively little work could be started prior to the onset of winter, only 8 projects involving 53 miles and \$1.5 million of APW funds were completed at the close of the year. Six of these were in Illinois.

National parkways and park and monument roads

CONSTRUCTION OR IMPROVEMENT of highways within or approaching national parks or monuments, and of parkways specifically designated by Federal legislation, is financed by funds appropriated to the Department of the Interior. These funds are administered under regulations jointly approved by the Secretary of the Interior and the Secretary of Commerce. The Bureau of Public Roads collaborates with the National Park Service of the Department of the Interior in establishing road systems and developing annual programs. Public Roads engineers make surveys, prepare plans and specifications, and supervise the construction of the major projects on these road systems.

During the fiscal year, improvements were completed on 183 miles of parkways and roads in national parks and monuments, involving Federal funds totaling \$17.4 million. At the end of the year, additional improvements were underway on 304 miles involving Federal funds totaling \$47.4 million. Table 19 of the appendix shows the general location, mileage, and cost of this construction activity for the National Park Service during the past year. Some of the improvements are briefly described in the following paragraphs.

Blue Ridge Parkway.—This 469-mile parkway extends from the Shenandoah National Park in Virginia to the Great Smoky Mountains National Park in North Carolina. (The recent extension of Shenandoah National Park southerly some 8 miles correspondingly reduced the parkway's former length.) A total of 422 miles of the parkway were open to traffic, 220 in North Carolina and 202 in Virginia.

During the fiscal year construction was completed on 58 miles of the parkway involving \$4.9 million of Federal funds. At the close of the year, additional work was underway on 58 miles and involving \$13.2 million of Federal funds.

Construction within the 15-mile gap in Virginia, near Roanoke, progressed during the year to a substantial degree. Grading work was well along and all of the bridges were under contract.

In North Carolina there are two significant gaps in which construction of the parkway is not completed. One of these is in the vicinity of Grandfather Mountain where construction has long been delayed because of right-of-way difficulties. Travelers can get around this gap via U.S. 221. At the other gap, near Asheville, considerable construction activity was underway, involving structures, tunnels, grading, and surfacing.

Foothills Parkway in Tennessee.—During the year a 4-mile project involving \$514,000 of Federal funds was completed on this parkway, extending it to

Murray Gap in the Chilhowee Mountains. A contract for \$966,000 was let during the year to extend the parkway 7 miles to the Little Tennessee River. A preliminary location survey for the Gatlinburg bypass on the Foothills spur line was completed, and the State was acquiring necessary right-of-way.

Natchez Trace Parkway.—Work continued on this 450-mile parkway in Alabama, Mississippi, and Tennessee, extending from Nashville to Natchez. Contracts were completed during the year involving 38 miles and \$4.4 million of Federal funds. Additional construction involving 57 miles and \$8.5 million was under contract at the close of the year. Biggest contract completed was the steel superstructure of the 5,066-foot bridge over the Tennessee River, costing \$1.4 million. The contract for the concrete deck, railing, and painting of the bridge was 36 percent complete at the close of the year. A total of 226 miles of the parkway was open to traffic; 176 miles in Mississippi, 6 miles in Alabama, and 44 miles in Tennessee.

Proposed Allegheny Parkway.—The Chairman of the Senate Appropriations Committee, in a letter to the Secretary of the Department of the Interior, requested a reconnaissance study be made to determine the most feasible location for and the probable cost of a proposed Allegheny Parkway between Hagerstown, Md., and Cumberland Gap on the Kentucky-Virginia State line, an overall length of 600 miles. The National Park Service, in turn, requested Public Roads to participate in the study. By the end of the year Public Roads location and design engineers, in cooperation with National Park Service personnel, had completed most of the field work and preparation of a report was underway.

Grand Canyon National Park.—During the past year construction involving \$500,000 of Federal funds was completed on 12 miles of the Cape Royal and Point Imperial roads in this park in Arizona. Work on the East Rim Drive and East Entrance Road, estimated to cost \$1 million, was nearing completion at the close of the year. This project involved 9 miles of grading and surfacing, improving of parking areas, and observation points and access roads thereto. Such improvements were made necessary by the steadily increasing tourist traffic at Grand Canyon.

Bureau of Land Management roads

PUBLIC ROADS CONTINUED to provide engineering services for the Bureau of Land Management of the Department of the Interior in its program of road construction in Oregon. Such services included making surveys, preparing plans and specifications, and supervising the construction of roads providing access to areas for logging operations. During the year, construction was completed on 121 miles involving Federal funds totaling \$5.6 million. At the close of the year, 24 other projects were under contract for construction on 175 miles involving Federal funds totaling \$7.1 million. Eight of these projects involving 37 miles were in the Accelerated Public Works program and were financed in part with \$1.3 million of APW funds. (These were from APW funds made available to the Bureau of Land Management, not from the \$15 million made available to Public Roads.)

Public Roads also performed necessary maintenance operations during the year for the Bureau of Land Management, as requested, since the roads involved are not on a county or State road system. During the year, Public Roads maintained 893 miles of roads—381 miles constructed under its supervision and 512 miles of feeder roads constructed by others—at a cost of \$707,100.

The Federal-Aid Highway Act of 1962 provided, for the first time, for a construction program of public lands development roads and trails. In planning for the operation of this program, the Bureau of Public Roads and the Bureau of Land Management on May 13, 1963, entered into an interagency agreement

setting forth the responsibilities of each agency. At the discretion of the Bureau of Land Management, some projects may be surveyed, designed, and constructed under its own direct responsibility, following Public Roads approval of the plans, specifications, and estimates. In other instances and at the request of the Bureau of Land Management, Public Roads will undertake the survey, design, and supervision of construction of specified projects. At the close of the year a detailed operating procedure was being developed.

Forest development roads

AT THE REQUEST of the Forest Service, Public Roads makes surveys, prepares plans and specifications, and supervises construction of roads within national forests which are of primary importance in the protection, administration, and use of the forests, or which are necessary for the use and development of the resources upon which the communities within or adjacent to the national forests are dependent. During the past year, construction under Public Roads' direct supervision was completed on 14 miles of forest development roads involving \$1.3 million of Federal funds. At the close of the year, 28 miles were under construction involving Federal funds totaling \$1.5 million.

Public lands highways

THE FEDERAL-AID HIGHWAY ACT of 1962 authorized an additional \$6 million of public lands funds for fiscal year 1963 and \$9 million for fiscal year 1964 for the improvement of roads through unappropriated, unreserved public lands, nontaxable Indian lands, or other Federal reservations. Twenty-six State highway departments proposed 64 projects totaling \$77 million in cost for the utilization of these funds. Allotments were made to 11 projects in 13 States as the most worthy from the standpoint of need and lack of availability of other funds to accomplish the work proposed. The allotments provided \$400,000 for the improvement of a section of U.S. 93 in Arizona extending southerly from the Hoover Dam; \$3 million for the development of the Skyline Drive in Arkansas and Oklahoma; \$2.8 million for the development of the Tellico Plains-Robbinsville Road in the Nantahala and Cherokee National Forests in North Carolina and Tennessee; \$324,000 to complete work to the Tesnatee Gap on the Richard Sims-Dukes Creek Falls Road in Georgia; \$300,000 for the improvement of Idaho State Route 51 approaching the Duck Valley Indian Reservation; \$350,000 for continuing work on the Red Lodge-Cooke City Road in Montana, an approach to the Yellowstone National Park; \$200,000 for additional work on Forest Highway 8 in New Hampshire; \$300,000 for the further improvement of U.S. 666 in the Navajo Indian Reservation in New Mexico; \$200,000 for the improvement of U.S. 395 south of Riley in Oregon; \$3 million for the construction of bridges on Utah State Route 95 to provide a crossing of the Glen Canyon Dam Reservoir at Hite; and \$3.5 million for the development of the Highland Scenic Drive in the Monongahela National Forest in West Virginia.

The Great River Road

FUNDS TO EXPEDITE the planning and coordination of a continuous Great River Road, traversing the Mississippi Valley from Canada to the Gulf of Mexico, were provided by the Federal-Aid Highway Act of 1954. At the request of the ten affected State highway departments, the Bureau of Public Roads and the National Park Service have completed studies and selected an alinement for development on both sides of the river. The second phase of planning, to select and designate scenic easements, was completed in Iowa and the northern portion of Minnesota during the year. A report designating scenic easements was previously prepared for Tennessee and studies were in progress in Wisconsin, Arkansas, and Illinois.

Repair of Roads Damaged by Natural Disaster

FEDERAL HIGHWAY LEGISLATION provides for a continuing authorization of up to \$30 million, replenished as needed on an annual basis, as an emergency fund for assisting the States in financing 50 percent of the cost of the repair and reconstruction of highways and bridges on the Federal-aid systems seriously damaged or destroyed by floods, earthquakes, or similar catastrophies over a wide area. Similarly damaged highways in the public domain, such as in national forests, parks, and Indian reservations, are eligible for repair or reconstruction with emergency funds without State matching funds, whether or not these highways are on the Federal-aid systems.

During the fiscal year 1963, allotments totaling \$2,340,410 were made for the repair and reconstruction of roads on the Federal-aid systems damaged by such natural disasters. Also, allotments totaling \$696,216 were made for the repair and reconstruction of roads in the public domain similarly damaged. Of these allotments, California received \$739,500; Idaho, \$810,135; Iowa, \$279,369; Kentucky, \$338,000; Maryland, \$84,600; Oregon, \$338,700; South Dakota, \$136,065; Washington, \$150,187; and West Virginia, \$160,070.

During the fiscal year an affirmative finding was made that the damages due to floods during February in Washington and March in West Virginia were eligible for participation of emergency funds. Preparation of plans and estimates of cost to repair damages occasioned by these two floods were underway at the end of the fiscal year.

During the year there were 18 declarations by the President of major disasters in 15 States (in Washington, Oregon, and California, there were two such declarations for each State) bringing the provisions of Public Law 875 into effect with respect to highways. In all such cases, the Bureau of Public Roads was requested by the Office of Emergency Planning to render technical assistance in connection with the emergency repair (or temporary replacement) of roads, streets, and bridges not on the Federal-aid systems. Federal funds totaling \$8.5 million were allocated by the Office of Emergency Planning for the temporary repair of off-system roads in California, Florida, Georgia, Hawaii, Idaho, Iowa, Kentucky, Nebraska, Nevada, Oregon, South Dakota, Tennessee, Virginia, Washington, and West Virginia.

Highway Needs of the National Defense

Emergency planning and mobilization readiness

PUBLIC ROADS CONTINUED to cooperate with defense agencies to assure that defense considerations were given appropriate attention in highway development. During the year, with the support and encouragement of the new Office of Emergency Transportation established in the Department of Commerce in the Office of the Under Secretary for Transportation, Public Roads brought the National Highway Users Conference into the joint effort of highway agencies which were preparing for the responsibility of highway traffic regulation under emergency conditions. This is a function requiring participation and teamwork of highway departments and police working in close association with emergency transportation organizations and organized highway users. The purpose is to regulate use of highways in such manner as to assure observance of priorities and allocations established by national and State transportation authorities. Public Roads has the responsibility of developing nationwide readiness to perform this function.

Activity in the field of emergency readiness planning continued at a satisfactory level during the year. In September 1962, concurrent with the national mobilization exercise Spade Fork, a joint exercise was arranged by Public

Roads in Oklahoma to test plans and procedures for highway traffic regulation under assumed emergency conditions. This exercise had as participants officials of the State highway department, the police department, the civil defense agencies of Oklahoma, representatives of the Transportation Corps of the Army, the National and State Highway Users Conferences, and the Bureau of Public Roads. The exercise was beneficial in providing experience and guidance for the future development and improvement of the program.

With the Cuban crisis in October 1962, the mobilization plans and procedures developed in Public Roads were put to a real test. The plans developed in the Washington and field offices were found satisfactory and capable of appropriate implementation.

The continued support of the program of emergency readiness by the American Association of State Highway Officials was evidenced during the year by the increase of its Emergency Planning Committee to include representation from each State highway department.

Progress was made toward the attainment of essential capability in radiological monitoring of highways. There were more than 20,000 persons in highway agencies trained in the use of monitoring instruments.

Four meetings were conducted during the year in Bureau regional offices for the orientation of the Bureau's Executive Reservists, now numbering 100.

Interim relocation sites were acquired by Bureau field offices and some State highway departments, and measures were proceeding to prepare them for the use of relocatees should that become necessary.

Defense access, replacement, and maneuver roads

STATE AND LOCAL HIGHWAY DEPARTMENTS continued to cooperate with Public Roads in making improvements needed to provide adequate highway service to defense installations and activities. In this program, Public Roads makes evaluation of access-road needs of defense installations as requested by the agencies concerned. Road improvements that cannot be accomplished appropriately under regular highway programs are handled under the defense access, replacement, and maneuver road program when certified as important to the national defense. Funds transferred from defense agencies are used to finance this work. Similar arrangements are made with the Atomic Energy Commission and the National Aeronautics and Space Administration. Plans, surveys, and estimates and supervision of construction are generally handled by State highway departments on substantially the same basis as regular Federal-aid highway programs. A relatively small portion of the work is also handled under the direct supervision of Public Roads.

During the fiscal year, funds transferred by the Department of Defense totaled \$23,966,604, including \$585,756 from the Department of the Army and \$23,380,848 from the Department of the Air Force. The Atomic Energy Commission and the National Aeronautics and Space Administration each transferred \$4.5 million to finance road improvements to serve the AEC-NASA test site near Las Vegas, Nev. NASA transferred a total of \$6,551,132 to finance five projects (including their \$4.5 million for the AEC-NASA test site).

During the year 48 projects serving defense installations were completely financed at a total cost of \$29 million, from funds transferred by the Department of Defense, and 8 projects were financed from funds transferred by the Atomic Energy Commission and the National Aeronautics and Space Administration. At the close of the year, four certified projects, having a total estimated cost of \$3.4 million, were not yet financed, except for preliminary engineering work which had been programed for three of them. Projects having a total estimated cost of \$4.4 million and requiring \$4.1 million of defense-access road funds were

awaiting certification by the Department of Defense. Twenty additional projects were being evaluated by Public Roads.

Public Roads continued to handle a large volume of work for the Department of Defense in connection with Minuteman missile installations. Condition surveys were completed on 2,600 miles of roads expected to be used as haul roads by contractors constructing installations in three States for Warren Air Force Base. Condition surveys were underway in two States for proposed missile sites for Grand Forks Air Force Base. Construction of low-type improvements on 1,011 miles of roads to serve operational needs at Ellsworth and Minot Air Force Bases was under contract at an estimated cost of \$3 million. An additional \$16.2 million was programed for low-type improvements in four States on 1,300 miles of roads serving missile sites for Warren and Whiteman Air Force Bases. Of this total, 383 miles were under contract.

Two projects, providing for restoration with defense-access funds of 111 miles of road damaged by operations of Air Force contractors constructing Titan missile sites at McConnell and Altus Air Force Bases, were programed in the amount of \$274,781.

Public Roads engineers assisted in site feasibility studies for Minuteman wings at nine locations in seven States, making available their knowledge of local road conditions and their technical competence. The estimated cost of road improvements to serve the 787 sites investigated was \$39.6 million.

Foreign Activities

The Inter-American Highway

THROUGH THE BUREAU OF PUBLIC ROADS, the United States since 1930 has been assisting the Republics of Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama in the construction of the Inter-American Highway, which is that section of the Pan American Highway System from Nuevo Laredo, on our Mexican border, to Panama City at the Pacific terminal of the Panama Canal, a distance of 3,142 miles. The section of the highway in Mexico has been financed and constructed entirely by Mexico. Connecting



An official bus motorcade toured the Inter-American Highway from Pauama City to Mexico City in the spring of 1963, to celebrate formal opening of the highway for its entire length.

highways from El Paso, Tex., and Nogales, Ariz., afford more direct routes to Mexico City from the western United States.

During the year the Inter-American Highway was opened to all-weather traffic for its entire length and the opening was officially celebrated by a motorcade tour which started from Panama City on April 16 and reached Washington, D.C., on May 4 prior to the opening of the Ninth Pan American Highway Congress on May 6 in Washington. The motorcade traveled in three buses from Panama City to Mexico City. Government officials and representatives of the United States, Canada, each of the Central American Republics, and many of the South American Republics participated in all or part of the motorcade tour. From Mexico City the group traveled by air to Detroit and then by bus and air with several stopovers to Washington, D.C.

The Inter-American Highway is now paved for 2,664 miles and the remaining 478 miles have an all-weather gravel surface, making it possible to travel from the United States to Panama City at any time of year. However, sections in Guatemala and Costa Rica still require widening and line correction to meet Inter-American Highway standards. In addition, the lack of frequent and complete tourist facilities, possible border delays due to customs procedures, occasional slides in the mountainous sections in the rainy season, and possible language difficulties make the entire trip more of an adventure than a similar-length trip in the United States.

During the year the Congress authorized \$32 million for the Inter-American Highway which, when matched by the cooperating Republics on the usual one-to-two basis, will provide \$48 million for completion of the substandard sections and paving of the gravel-surfaced sections. The status of the highway in each country is briefly described in the following paragraphs.

In Mexico the route is paved except for a 60-mile section near the Guatemala border.

In Guatemala little work was done during the year because of lack of funds. There still remained a total of 152 miles to be paved, along with considerable widening and flood prevention work in northern Guatemala.

In El Salvador and Honduras, and in Nicaragua except for a short 28-mile section which needs resurfacing, the highway has been completed.

In southern Costa Rica the last impassable gap in the highway was closed with the completion of 39 bridges, under construction for 2½ years. Work also progressed on plans for completion to standards and paving of the remaining unpaved 204 miles in Costa Rica.

In Panama the paving of a 37-mile section between Puerto Escondido and Guabala was completed during the year. This leaves only a 62-mile cutoff between Guabala and Santiago uncompleted. During the year the grading, drainage, subbase, and bridges on 35 miles of this section were completed and the paving advertised for construction. Plans were completed for the final 27-mile section of this cutoff. The old gravel road was being kept passable at all times during construction of the cutoff.

Other Central American projects

Guatemala.—Public Roads continued to furnish technical engineering assistance to the Agency for International Development (AID) in connection with the construction and improvement of the Pacific Highway in Guatemala, from the Mexican border to the border of El Salvador, and a rural development road program.

Nicaragua.—The United States continued assisting financially in the construction of the 155-mile Rama Road in Nicaragua, which will form the main transportation link between the settled portions of the country on the Pacific coast and the large undeveloped fertile areas of eastern Nicaragua and the Atlantic

Ocean. During the year 5 more miles of all-weather road were built, making a total of 145 miles completed.

Nicaragua continued its program of construction and repair on secondary and farm-to-market roads, with the aid of loans from the Export-Import Bank and AID. At the request of Nicaragua, Public Roads furnished a supervising engineer and necessary engineering and accounting assistants to aid in this program.

Costa Rica.—Public Roads continued its technical aid and assistance to the Government of Costa Rica on a \$15 million program of national highways, referred to as the Plan Vial, which is being financed by a loan from the World Bank. Assistance in the supervision of construction of the San Jose-El Coco airport 4-lane divided highway, financed by a loan from the Export-Import Bank, was also continued.

Panama.—Assistance being furnished by Public Roads to the Government of Panama in the operation and maintenance of construction equipment continued, but was cut back from three men to one.

Darien Gap.—The closing of the last gap in the Pan American Highway System advanced a step further when the Organization of American States awarded a contract to a private engineering firm for the survey and preparation of plans for a road through the 450-mile Darien Gap in Panama and Colombia. When this highway is completed it will provide the first land communication route between North and South America. The Bureau of Public Roads was furnishing technical assistance and engineering supervision on the project to the Organization of American States through the Pan American Union.

The Pan American Highway Congress

THE NINTH PAN AMERICAN HIGHWAY CONGRESS was held in Washington, D.C., May 6-18, 1963, and was attended by officials of 19 South and Central American countries, Canada, and the United States. Through technical papers and gatherings the more than 500 delegates exchanged information on all phases of highway transportation. Federal Highway Administrator Rex M. Whitton served as chairman of the Organizing Committee and was elected President of the Congress. Public Roads furnished much of the staff for the Congress planning and operation.

Other foreign aid activities

SINCE THE END OF WORLD WAR II the Bureau of Public Roads has provided technical assistance, advice, and consultation in many foreign countries in co-operation with the Department of State, the Export-Import Bank, and the International Bank for Reconstruction and Development (World Bank). The objectives of such assistance have been to further the programs of highway improvement and communications in those countries, thus fostering their economic and social growth. Emphasis has been given to aiding the countries in establishing competent highway organizations and training nationals to staff them.

Public Roads actively participated in highway improvement programs in 16 countries during fiscal year 1963. Programs in 11 of these—Bolivia, Brazil, Cambodia, Colombia, Jordan, Laos, Nepal, Peru, the Philippines, Sudan, and Yemen—were sponsored by the U.S. Agency for International Development (AID). In Iran the continuing program was financed by a loan from the Export-Import Bank. The program in Ethiopia, financed by a loan from the World Bank, was phased out during the year. Except for a new program in Brazil, the assistance programs carried on during fiscal year 1963 were all continuations of programs started in earlier years. In Lebanon the program continued until the end of the year under the sponsorship of the Lebanese Government. In

Spain the technical assistance program continued on a reduced basis throughout the year with funds provided by the Spanish Government.

Bolivia.—Under agreement with the Government of Bolivia, Public Roads undertook the procurement of \$2.4 million of highway maintenance equipment and tools, in a program financed through an AID development loan.

Brazil.—Public Roads personnel reviewed the nationwide and Northeast States highway development programs in Brazil for AID officials early in the fiscal year. As the Northeast States program materialized, six Public Roads engineers were sent to Recife to inspect and review for engineering adequacy the projects proposed for AID loans, covering 293 miles of construction estimated to cost \$18.4 million. In addition, a preliminary assessment was made of highway maintenance capabilities and needs in three States, and loan applications for \$7 million worth of maintenance equipment were reviewed. Subsequently a division engineer was assigned to assist the AID mission in providing advice and guidance to the Brazilian Highway Department, and to coordinate the Alliance for Progress program of highway development with AID policy and procedures.

Cambodia.—Public Roads activities continued on the 133-mile Khmer-American Friendship Highway between Sihanoukville, the port city on the Gulf of Siam, and Phnom Penh, the capital. A contract for rehabilitation of the road was awarded on September 13, 1962, and 13 percent of the work was completed during the year. The Public Roads staff of 14 continued the maintenance of the route until the arrival of the contractor's forces, then assumed the engineering supervision of the project and continued the training of Cambodian personnel in equipment maintenance and operation.

Colombia.—The Public Roads highway advisor to the AID mission in Colombia concluded the program of technical advice and assistance to the Ministry of Public Works in December 1962.

Ethiopia.—The Public Roads assistance program contract with Ethiopia, under which Public Roads provided principal management personnel to the Ethiopian Imperial Highway Authority, was ended by mutual agreement on May 10, 1963, and shortly thereafter the 16 remaining American technicians left Ethiopia. Over the 13 years the contract was in effect, Public Roads had built a comprehensive highway organization for the country and had trained Ethiopian engineers and administrative personnel to staff it. Early in 1963 it was recognized that these and Ethiopians trained in the United States and in third-country universities were capable of assuming full responsibilities for the Ethiopian highway system. On Public Roads' recommendation, the Imperial Highway Authority hired an American consulting engineering firm to assist them in some phases of operation that needed strengthening. During the year an Ethiopian design engineer was sent to the United States for advanced training in highway design and upon his return home was assigned to a responsible position in the Imperial Highway Department.

Iran.—The Public Roads program of technical advice and assistance to the Ministry of Roads in Iran, financed by a 2-year, \$3.5 million Export-Import Bank loan, continued throughout fiscal year 1963. Emphasis was again placed on maintenance activities, including some 300 miles of bituminous surface treatment. Bridge planning, survey and design, and materials survey and testing activities were also carried on. A major earthquake occurred in September 1962 and, as a result, a 70-mile emergency road construction program was undertaken and completed. On-the-job training was continued during the year, and Public Roads assisted in the operation of training schools for equipment mechanics and operators at which 100 students completed courses. A tire recapping plant was placed in operation during the year. Public Roads pre-

pared a report on the requirements for a new 5-year maintenance program, which will be used by the Government of Iran to support a new Export-Import Bank loan being negotiated. This loan would provide for a 25-man Public Roads staff in Iran and, accordingly, the existing 36-man staff was being reduced at the end of the year.

Jordan.—During the fiscal year the 9-man Public Roads staff in Jordan, in cooperation with AID, continued technical assistance to the Ministry of Public Works in highway and bridge design, highway planning, cost accounting, construction, maintenance, materials testing, and the repair and maintenance of highway equipment. Public Roads personnel also worked with the Ministry toward the organization and improved management of an integrated highway department. The 10-year cooperative highway construction program in Jordan was completed during the year with the formal opening of the Jerusalem-Dead Sea Highway in January 1963. Emphasis was placed on a major maintenance program during the year. Additional maintenance equipment was received and the training of personnel in mechanized highway maintenance was continued.

Laos.—The Public Roads assistance program in Laos, begun in 1959, was seriously handicapped in 1960 and 1961 by unsettled conditions; but during fiscal year 1963 the program was reactivated and the staff was increased from 10 to 19 men. Consultation and advice was given the Government on the preparation of nationwide annual road budgets and construction programs financed by AID. Some progress was made in establishing a roads and bridges section in the Ministry of Public Works. Arrangements have been made for moving Bailey bridge components from Korat in Thailand to Vientiane. The shops at the principal repair headquarters were in full operation, repairing heavy equipment and training Laos personnel. Improvement of provincial shops continued. Parts and commodity supply, warehousing, and control also continued to be improved. On April 9, 1963, Public Roads awarded a contract for 62 miles of grading and minor drainage work between Nam Hin Boun and Nam Ca Dinh. This will establish, for the first time, an all-weather route between the southern and central portions of Laos. Completion is anticipated during fiscal year 1965.

Lebanon.—Although the AID program in Lebanon was phased out on June 30, 1962, two Public Roads engineers remained in Lebanon during most of fiscal year 1963 at the expense of the Government of Lebanon. During the year the two engineers supervised the design of a major interchange on the North Coastal Road, and prepared a *Standard Specification for Road and Bridge Construction* in Lebanon. A report was prepared for the Director of Roads, at his request, on the programing of highway improvement projects with funds available from the annual budget; and a geometric sufficiency report was prepared for the entire Beirut-Syrian Border Road.

Nepal.—Public Roads has been furnishing technical assistance to the Government of Nepal in highway improvement since 1958 under a tripartite agreement among the Governments of Nepal, India, and the United States, but that agreement was terminated in December 1962. Negotiations were underway for a new agreement between the Governments of Nepal and the United States. Termination of the tripartite agreement resulted in the closing down of much of the construction work underway and a general curtailment of maintenance activities. However, the Public Roads 7-man staff continued its program of assistance in construction activities, particularly drainage structures, and in maintenance work both with machine equipment and by hand labor.

Peru.—Public Roads continued to provide technical assistance to the Government of Peru on its construction program financed by AID and Export-Import Bank loans. This program, consisting of 350 miles of construction at a cost of

over \$26 million, continued to comprise the major highway construction program of the country. A highway materials engineer and a highway planning engineer went to Peru for 3- and 6-month assignments, to inspect projects and make recommendations concerning materials controls and tests. Short courses were prepared and given on the procedures and uses of photogrammetry.

The Philippines.—Three Public Roads advisors continued to assist in implementing a Philippine highway program financed in part by a loan from the Development Loan Fund of up to \$18.75 million for procuring equipment and materials and for the rehabilitation of equipment. The Philippine Government was financing an equivalent amount in this undertaking. Some \$7.8 million of the loan fund had been certified as eligible for procurement and financed, and \$6.1 million of this amount had been used.

Spain.—Public Roads technical assistance to Spain during the year was financed by the Spanish National Highway Department. Four Public Roads engineers were in Spain for at least part of the year, and one will remain for another year. During the year a planning and design office was organized in the Barcelona district and Public Roads assisted in its activities. Other planning activities included completion of a needs study for Leon Province. A program of developing highway transportation maps of Spain by provinces was undertaken. Public Roads continued to work toward improving the maintenance division organization and training programs, and considerable work was done on the preparation of a maintenance manual and a separate equipment manual. Additional recommendations were made for the administrative organization of the Highway Department and of its individual divisions. Several Spanish engineers studied in the United States during the year.

Sudan.—The Public Roads program continued in Sudan with 10 Public Roads engineers and equipment specialists furnishing technical advice and training to the Ministry of Works in techniques of highway design, construction, and maintenance, and in equipment operation and maintenance. Highway development and maintenance training continued on the Gordon Tree-Jebel Aulia highway. A contract was let for construction of the 110-mile Khartoum-Wad Medani highway and the work was being supervised by Sudanese with Public Roads advice on contract engineering and preparation of pay documents. Equipment specialists assisted in establishing parts inventory and requisition control procedures at equipment depots. An equipment specialist assisted Sudanese personnel in the Southern Province in operation, maintenance, and repair of construction and shop equipment and in proper highway maintenance operations. Three Sudanese were sent to the United States and three to Turkey for training, and upon their return they were assigned to responsible posts in the Ministry of Roads.

Turkey.—The Public Roads computer specialist assigned to Turkey continued his services through October 1962. During this period important electronic computer programs were completed, for inventory control of equipment supply items and for highway design. During the year, the Washington office of Public Roads undertook a \$4 million equipment procurement program for the Turkish Forestry Service. At the end of the year specifications for most of the equipment to be procured had been written, and some buying had been accomplished.

Yemen.—During the fiscal year Public Roads had 43 engineers and technicians supervising 975 Yemeni employees and 15 third-country nationals in construction of the 260-mile highway from the seaport of Mocha through Taiz to the capital at Sanaa. Early in the year the 70-mile Mocha-Taiz section was completed and a maintenance organization established with 2 Americans and 27 Yemeni. Construction continued during the fiscal year on the 190-mile Taiz-Sanaa section, and 40 miles were completed. As the result of a coup following the death of the Imam, a new Yemen Arab Republic Government was formed. Unsettled con-

ditions slowed the highway operations during this period although Americans were not endangered at any time. An agreement was reached with the new Government by which a Yemen Public Roads division was established within the Ministry of Public Works, and plans were developed whereby the division would provide highway maintenance on sections of the road as they were completed. Training in both administrative and operational phases of the maintenance organization was initiated. An extensive training program was also carried on during the year to familiarize Yemeni with equipment operation and maintenance, using a modern shop and regular classes in equipment repair and maintenance.

Foreign study programs

WITH THE COOPERATION of the State highway departments, counties, cities, and private industry, the Bureau of Public Roads arranged 459 man-months of study during the year for 490 highway officials, engineers, and technicians from 50 different countries who came to the United States to study and observe our techniques and practices. While the majority of the foreign visitors were sponsored by the Agency for International Development, other referrals to Public Roads were made by the Bureau of Educational and Cultural Exchange of the Department of State, the United Nations, private foundations, and their own governments. The second group program in Ohio for 22 foreign engineers from 10 countries came to a successful conclusion in October 1962. In June 1963 a third group of 14 foreign engineers from 8 countries began a 7-month Foreign Highway Engineers Institute in Colorado. Similar group programs were being planned for succeeding fiscal years.

Appendix

LIST OF TABLES

	Page
1. Summaries of Federal-aid and Federal highway programs approved and work completed in the fiscal year 1963, by class of highway and by fund.....	76
2. Federal-aid and Federal highway projects under construction or plans approved on June 30, 1963, by class of highway and by fund.....	78
3. Projects financed with Federal-aid funds programed during the fiscal year ended June 30, 1963, by State.....	80
4. Projects involving Federal funds awarded to contract during the fiscal year ended June 30, 1963, by program and by State.....	82
5. Status of Federal-aid projects as of June 30, 1963, including projects completed during the fiscal year.....	84
6. Mileage of Federal-aid highway projects completed during fiscal year 1963, by program and by number of lanes.....	86
7. Lane classification of mileage of Federal-aid highway projects completed during fiscal year 1963, by class of fund.....	87
8. Apportionment of Federal-aid highway funds authorized for the fiscal year ending June 30, 1964.....	88
9. Federal highway funds paid by Bureau of Public Roads during fiscal year ended June 30, 1963, by program and by State.....	90
10. Balances of Federal-aid funds available to States for projects not yet programed, as of June 30, 1963.....	92
11. National System of Interstate and Defense Highways: Improvement status of mileage as of June 30, 1963.....	94
12. Status of Interstate System improvement as of June 30, 1963, financed with Federal-aid funds, including projects completed during the fiscal year.....	96
13. Status of improvement of the Federal-aid primary system in rural areas as of June 30, 1963, financed with Federal-aid funds, including projects completed during the fiscal year.....	98
14. Status of improvements on secondary roads in rural areas as of June 30, 1963, financed with Federal-aid funds, including projects completed during the fiscal year.....	100
15. Status of improvements in urban areas as of June 30, 1963, financed with Federal-aid funds, including projects completed during the fiscal year.....	102
16. Mileage of designated Federal-aid highway systems, by State, as of December 31, 1962.....	104
17. Status of national forest highway projects as of June 30, 1963, and projects completed during the fiscal year.....	106
18. Mileage of the national forest highway system, by forest road class and by State, as of June 30, 1963.....	108
19. Highway construction in national battlefield sites, monuments, parks, and parkways, under direct supervision of the Bureau of Public Roads during fiscal year 1963.....	109

Table 1.—Summaries of Federal-aid and Federal highway programs approved and work completed in the fiscal year 1963, by class of highway and by fund

	PROGRAMS APPROVED ¹					WORK COMPLETED						
	Total cost	Federal funds	Miles	Railway-highway grade-crossing improvements			Total cost	Federal funds	Miles	Railway-highway grade-crossing improvements		
				Crossings eliminated	Structures reconstructed	Crossings protected				Crossings eliminated	Structures reconstructed	Crossings protected
BY CLASS OF HIGHWAY												
Primary rural:												
Interstate.....	\$1,866,216,763	\$1,665,834,968	3,341.6	96	3	3	\$986,318,919	\$882,655,462	2,367.4	84	2	
All other.....	795,685,637	417,111,101	4,900.7	45	15	46	688,132,485	362,246,527	4,835.0	88	38	
Secondary rural.....	504,074,768	269,327,063	11,108.3	31	13	226	508,323,873	264,563,823	12,209.2	34	19	
Urban:												
Interstate.....	1,145,071,814	998,338,227	382.3	69	3	1	813,242,097	717,392,905	370.8	76	1	
All other.....	628,084,040	316,001,518	677.0	94	15	66	459,141,980	236,441,050	540.9	100	20	
Subtotal.....	4,939,133,022	3,667,612,877	20,418.9	335	49	342	3,455,159,354	2,463,302,367	20,383.3	382	80	
Not classified ²	173,028,885	160,910,287	3,640.3	-----	9	-----	83,105,120	78,879,797	1,669.5	5	10	
Total.....	5,112,161,907	3,828,523,164	24,059.2	335	58	342	3,538,264,474	2,542,182,164	22,052.8	387	90	
BY FUND												
Federal aid:												
Primary.....	869,762,864	458,393,328	5,036.5	67	18	59	737,243,435	388,047,832	4,948.3	96	42	
Secondary.....	550,910,485	268,767,179	11,223.1	40	15	238	527,200,776	273,872,509	12,319.6	35	19	
Urban.....	510,409,617	251,806,183	435.7	63	10	41	402,936,988	207,199,040	385.6	91	16	
Interstate.....	3,008,050,026	2,663,641,187	3,723.6	165	6	4	1,787,775,155	1,594,182,386	2,729.8	160	3	
Subtotal.....	4,939,133,022	3,667,612,877	20,418.9	335	49	342	3,455,159,354	2,463,302,367	20,383.3	382	80	

Defense access roads.....	42,482,176	40,595,211	2,024.0	9	20,729,656	20,489,919	667.0	5	10	2
National forest highway ³	40,770,173	36,292,138	451.3		30,251,338	28,590,476	478.2			
National park and parkway ⁴	51,479,100	51,479,100	416.6		17,380,755	17,380,755	183.2			
Bureau of Land Management ⁴	(5)	(5)	(5)		5,585,414	5,585,414	120.6			
Forest development ⁴	(5)	(5)	(5)		1,291,000	1,291,000	13.8			
Public lands.....	9,963,081	9,956,794	88.8		1,611,345	1,605,200	35.6			
Emergency flood-relief.....	5,923,228	3,413,153	149.8		6,052,035	3,734,646	108.4			
Pentagon network ⁴	1,732,000	1,732,000	8.6							
Public Works Acceleration program.....	20,679,127	17,435,891	501.2		164,121	163,121	2.6			
Bridges over Federal dams.....					39,206	39,206	.1			
Subtotal.....	173,028,885	160,910,287	3,640.3	9	83,105,120	78,879,797	1,699.5	5	10	2
Total.....	5,112,161,907	3,828,523,164	24,059.2	58	3,538,264,474	2,542,182,164	22,052.8	387	90	326

¹ Initial commitment of funds.

² Defense-access, forest, park, Bureau of Land Management, forest development, public lands, emergency flood-relief, Pentagon network, and Public Works Acceleration projects, and bridges over Federal dams.

³ Includes construction projects only.

⁴ Construction supervised by Bureau of Public Roads.

⁵ Data not available.

Table 2.—Federal-aid and Federal highway projects under construction or plans approved on June 30, 1963, by class of highway and by fund

	Total cost	Federal funds	Miles	Railway-highway grade-crossing improvement		
				Crossings eliminated	Structures reconstructed	Crossings protected
BY CLASS OF HIGHWAY						
Primary rural:						
Interstate.....	\$3,917,681,074	\$3,503,401,598	6,135.0	256	9	10
All other.....	1,469,995,003	777,460,244	7,751.9	121	42	92
Secondary rural.....	874,822,356	408,161,259	15,895.9	63	16	388
Urban:						
Interstate.....	4,160,053,313	3,677,932,403	908.8	214	8	8
All other.....	1,517,705,034	764,583,547	1,215.5	203	33	119
Subtotal.....	11,940,256,780	9,191,539,051	31,907.1	857	108	617
Not classified 1.....	199,548,340	186,758,863	3,716.3	-----	9	-----
Total.....	12,139,805,120	9,378,297,914	35,623.4	857	117	617
BY FUND						
Federal-aid:						
Primary.....	1,629,842,282	864,092,271	7,976.4	151	47	109
Secondary.....	948,709,140	505,111,295	16,027.3	75	19	403
Urban.....	1,298,585,144	648,092,005	859.8	161	25	87
Interstate.....	8,063,120,214	7,174,243,480	7,043.6	470	17	18
Subtotal.....	11,940,256,780	9,191,539,051	31,907.1	857	108	617

Defense access roads.....	27,310,429	26,730,836	1,536.4	9	
National forest highway ²	68,967,926	65,758,312	825.9		
National park and parkway ³	47,371,946	47,371,646	300.0		
Bureau of Land Management ³	7,317,326	7,317,326	175.4		
Forest development ³	1,472,839	1,472,839	27.5		
Public lands.....	8,089,285	7,496,834	118.0		
Emergency flood-relief.....	11,488,717	6,347,816	234.0		
Pentagon network ³	981,503	981,503			
Public Works Acceleration program.....	20,515,906	17,272,770	498.5		
Bridges over Federal dams.....	5,048,962	5,024,280	.5		
Washington National Airport.....	954,701	954,701	.1		
Subtotal.....	199,548,340	186,758,863	3,716.3	9	
Total.....	12,139,805,120	9,378,297,914	35,623.4	117	617

¹ Defense-access, forest, park, Bureau of Land Management, forest development, public lands, emergency flood-relief, Pentagon network, and Public Works Acceleration projects, bridges over Federal dams, and Washington National Airport roads.

² Includes construction projects only.
³ Construction supervised by Bureau of Public Roads.

Table 3.—Projects financed with Federal-aid funds programed ¹ during the fiscal year ended June 30, 1963, by State

State or Territory	Primary			Secondary			Urban			Interstate			Total	
	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds
Alabama-----	\$17,895,578	\$8,606,654	170.5	\$14,020,442	\$6,968,680	433.5	\$86,210,991	\$3,050,871	15.6	\$21,034,125	\$18,931,762	18.1	\$60,061,136	\$37,557,967
Alaska-----	22,086,574	20,822,915	87.6	14,506,648	13,740,415	112.9	17,499	16,532					36,010,721	34,579,862
Arizona-----	9,884,425	7,719,209	69.9	4,339,983	3,350,930	41.0	2,651,071	2,164,948	5.3	35,872,814	34,319,600	97.1	52,748,293	47,554,687
Arkansas-----	7,407,701	3,721,966	41.6	9,639,665	4,863,020	210.5	2,502,782	1,255,876	3.2	51,502,293	46,352,647	126.2	71,062,441	56,198,559
California-----	61,902,668	33,821,150	92.4	18,327,027	10,371,291	185.8	66,792,507	25,680,881	24.5	198,927,114	141,306,013	118.2	345,949,406	211,239,335
Colorado-----	18,899,140	10,169,169	121.3	9,231,162	5,257,312	177.6	3,617,630	2,092,982	14.1	38,296,801	34,658,364	88.5	70,074,733	51,996,827
Connecticut-----	6,632,557	3,064,126	4.0	3,323,403	1,975,182	8.6	7,725,729	3,854,953	2.3	61,269,606	54,816,191	13.5	78,951,293	63,210,432
Delaware-----	7,157,132	3,583,356	20.0	2,243,161	1,132,986	2.8	200,434	100,754	.1	9,502,540	8,549,790	.9	19,105,267	13,366,836
Florida-----	25,550,200	12,722,748	145.3	11,637,502	5,819,961	189.5	8,126,581	4,009,174	18.9	51,212,630	46,115,428	108.0	96,556,913	68,667,309
Georgia-----	12,725,527	6,369,592	49.6	15,061,798	7,546,960	292.7	4,572,693	2,378,531	6.2	53,015,121	47,716,006	59.6	85,374,539	64,011,089
Hawaii-----	1,366,000	653,000	1.9	3,117,630	1,558,515	.9	3,027,163	1,428,975	.2	2,461,333	2,175,973		9,911,586	5,816,463
Idaho-----	7,875,715	5,500,379	66.7	4,335,205	2,774,247	100.4	600,069	362,158	2.4	7,412,024	7,265,711	35.0	20,653,013	15,902,495
Illinois-----	33,021,334	16,475,105	133.8	24,850,003	12,369,644	465.3	29,908,860	15,788,694	33.8	166,023,776	149,113,042	106.9	253,803,973	193,746,435
Indiana-----	23,872,376	11,940,082	202.0	11,935,857	6,027,472	74.0	10,311,618	5,169,943	9.4	106,591,432	95,936,224	109.9	152,711,283	119,073,771
Iowa-----	22,274,457	11,211,047	256.0	15,982,354	8,104,173	597.7	4,386,599	2,366,391	7.9	28,524,342	25,746,793	76.9	71,167,752	47,428,404
Kansas-----	18,940,655	9,481,615	187.0	13,196,439	6,684,977	652.5	2,976,288	1,516,730	3.2	36,119,435	32,465,568	127.4	71,292,817	50,149,890
Kentucky-----	18,765,656	9,438,017	51.7	11,200,049	5,404,307	69.3	6,762,981	3,313,662	9.4	46,595,920	41,933,442	76.7	83,394,587	59,989,428
Louisiana-----	12,320,710	6,459,764	71.1	10,206,807	5,114,069	67.4	8,559,073	3,901,223	10.0	81,818,920	73,638,057	39.5	112,905,510	89,173,113
Maine-----	3,193,749	1,604,347	13.3	3,725,227	1,876,138	34.2	1,450,612	782,978	1.2	20,012,180	18,007,146	36.4	28,381,768	22,270,629
Maryland-----	9,318,602	4,572,869	24.5	3,293,324	1,773,757	66.3	4,538,144	2,285,090	2.6	67,453,166	60,123,230	41.6	84,603,236	67,754,976
Massachusetts-----	3,176,867	1,738,572	6.0	4,312,969	2,149,240	16.7	10,678,977	5,288,788	3.2	88,810,098	79,217,522	60.0	106,978,931	88,394,122
Michigan-----	27,752,721	13,912,015	208.4	17,808,909	9,010,713	562.4	26,706,771	13,243,080	37.8	71,470,897	63,869,016	58.4	143,769,258	100,034,824
Minnesota-----	769,016	494,422	236.8	17,155,358	8,309,432	769.0	6,994,209	3,552,671	5.6	57,019,492	51,174,332	85.7	101,682,358	73,398,872
Mississippi-----	11,655,345	5,927,292	95.4	18,067,979	8,401,835	547.0	4,784,425	2,431,638	7.1	40,090,579	36,250,090	126.7	74,598,328	53,630,875
Missouri-----	29,903,789	15,195,412	70.6	17,124,041	8,633,310	516.5	11,000,640	5,715,971	12.6	97,091,136	87,147,277	112.2	155,179,606	116,691,970
Montana-----	15,265,747	9,429,068	184.5	10,721,650	6,683,555	148.7	486,193	272,120	1.4	35,661,417	32,730,603	82.5	62,135,007	49,115,346
Nebraska-----	18,457,083	9,365,519	243.4	8,056,316	4,133,516	300.6	5,953,407	2,879,884	5.8	17,819,428	16,283,598	42.1	50,285,874	32,661,517
Nevada-----	8,122,223	7,264,366	40.6	4,214,590	3,788,565	42.0	1,148,465	1,009,541	1.3	26,016,665	24,917,473	55.8	39,501,943	36,979,945
New Hampshire-----	6,789,364	3,346,006	17.6	1,273,731	637,295	3.8	1,118,005	559,473	1.9	18,493,167	16,570,215	22.0	27,674,867	21,112,929
New Jersey-----	15,248,082	7,625,542	13.1	6,544,327	3,243,037	25.8	42,152,069	20,914,718	18.5	38,461,798	33,861,815	12.1	102,106,268	65,678,112
New Mexico-----	9,650,831	3,771,445	66.7	6,354,176	4,315,250	81.0	583,113	374,745	2.3	34,464,676	32,010,041	78.5	51,632,798	31,462,781
New York-----	44,136,731	20,393,110	123.4	15,201,120	7,412,313	68.9	61,447,232	27,632,854	26.9	192,230,652	167,090,858	61.0	313,077,735	222,591,145

North Carolina-----	22,690,810	11,461,352	74,531,785,490	16,125,468	216,512,423,551	6,582,984	13,4	26,288,629	22,793,484	49,9	93,188,480	56,966,288	354,3
North Dakota-----	9,826,941	4,938,333	200,8	8,997,685	4,533,385	627,5	614,440	25,863,804	23,627,016	128,6	45,202,960	33,373,056	957,5
Ohio-----	31,787,735	17,461,395	64,613,827,063	7,271,353	78,526,401,291	15,125,432	9,7	227,324,783	202,639,827	146,8	299,340,872	241,921,007	299,6
Oklahoma-----	19,567,167	9,727,302	106,512,738,138	6,437,261	316,0	8,551,418	4,420,756	21,6	50,465,051	102,8	91,621,804	63,945,956	546,9
Oregon-----	20,101,294	5,974,014	31,2	6,127,175	3,739,283	66,7	3,979,776	4,0	39,426,931	98,6	76,118,330	51,631,675	200,5
Pennsylvania-----	25,695,123	12,826,209	28,6	18,901,977	9,339,559	82,0	31,106,533	15,304,666	21,8	158,667,225	234,370,858	180,006,205	250,2
Rhode Island-----	3,207,769	1,604,417	2,8	2,990,875	1,495,793	15,2	6,165,218	2,994,970	1,2	15,306,028	27,669,890	19,442,852	21,0
South Carolina-----	13,961,334	6,960,722	121,3	10,224,788	5,212,172	548,4	2,661,709	1,331,315	1,6	23,325,605	50,173,436	34,658,324	713,5
South Dakota-----	13,680,739	7,563,788	299,2	9,109,110	5,123,552	471,9	102,193	56,671	---	21,842,099	44,734,141	32,629,908	871,2
Tennessee-----	14,839,436	7,431,770	89,7	10,178,364	4,917,838	315,6	7,701,690	4,267,219	5,1	63,495,146	96,234,632	73,765,654	566,7
Texas-----	62,637,533	32,522,235	535,6	32,636,425	16,286,553	822,5	26,545,512	14,277,912	30,2	165,490,372	286,730,342	211,788,405	1,595,6
Utah-----	5,393,128	4,257,361	29,2	3,901,642	3,084,862	59,6	3,293,338	2,677,632	2,8	40,810,319	53,398,427	49,061,096	150,1
Vermont-----	3,209,281	1,601,258	10,8	2,698,366	1,352,082	18,0	291,767	130,966	---	19,664,947	25,834,361	20,734,358	60,2
Virginia-----	15,430,995	8,000,844	51,0	8,739,068	5,018,767	101,8	15,916,679	7,731,377	15,3	130,749,129	170,835,871	138,854,496	270,0
Washington-----	16,319,954	5,547,953	78,0	9,780,993	5,060,174	178,5	4,093,244	2,133,027	6,4	67,194,244	97,888,435	73,694,767	330,8
West Virginia-----	4,069,682	2,204,314	3,1	3,359,626	1,681,010	9,4	838,766	419,855	---	23,729,644	31,997,718	25,063,018	17,9
Wisconsin-----	20,442,128	10,085,323	130,9	17,783,314	9,187,975	316,6	4,857,063	2,671,905	5,5	41,350,865	84,433,370	58,423,292	500,8
Wyoming-----	5,752,415	3,824,966	51,7	5,301,057	3,568,930	97,9	436,622	339,500	,9	35,502,102	46,992,196	40,079,286	340,3
Dist. of Columbia-----	6,759,752	4,146,201	5,1	6,665,487	3,321,543	1,5	641,832	331,285	,8	23,634,301	37,701,382	28,976,696	9,0
Puerto Rico-----	2,574,800	1,239,695	2,4	3,833,670	1,571,554	14,0	5,533,803	2,736,013	---	---	11,912,273	5,547,262	16,4
Total-----	869,762,864	458,398,328	5,036,5	550,910,485	293,767,179	11,223,1	510,409,647	251,806,183	435,7	3,008,050,026	2,663,641,187	3,667,612,877	20,418,9

Initial commitment of funds. Columns may not add to totals due to rounding.

Table 4.—Projects involving Federal funds awarded to contract ¹ during the fiscal year ended June 30, 1963, by program and by State

State or Territory	Total cost	Total Federal funds	Federal-aid funds				Access funds	Miles
			Primary ²	Secondary	Urban ³	Interstate		
Alabama.....	\$92, 107, 405	\$67, 764, 217	\$6, 870, 840	\$6, 499, 538	\$2, 821, 613	\$51, 009, 326	\$72, 900	630. 0
Alaska.....	42, 748, 217	40, 191, 727	25, 028, 035	15, 095, 779	17, 913	-----	50, 000	277. 6
Arizona.....	48, 713, 438	43, 861, 603	5, 421, 410	3, 510, 633	560, 181	34, 369, 359	-----	200. 8
Arkansas.....	19, 237, 953	10, 782, 424	2, 178, 547	4, 913, 854	1, 500, 751	2, 185, 822	3, 450	246. 7
California.....	368, 805, 717	271, 336, 456	25, 261, 269	10, 221, 085	17, 293, 719	215, 225, 931	3, 334, 452	400. 1
Colorado.....	62, 281, 586	46, 971, 692	7, 730, 975	5, 036, 153	2, 483, 153	31, 287, 932	433, 449	393. 0
Connecticut.....	68, 498, 392	57, 241, 000	7, 275, 697	1, 975, 162	2, 906, 226	52, 054, 700	29, 215	24. 0
Delaware.....	17, 735, 116	12, 424, 999	3, 373, 696	762, 936	322, 754	7, 965, 613	-----	24. 6
Florida.....	124, 059, 164	96, 126, 850	8, 686, 235	6, 569, 503	3, 822, 187	75, 973, 693	1, 075, 232	529. 2
Georgia.....	111, 720, 090	85, 880, 908	9, 078, 238	7, 599, 691	2, 377, 127	66, 519, 927	305, 855	484. 5
Hawaii.....	4, 963, 591	3, 352, 173	716, 928	407, 300	3, 350	2, 209, 597	15, 000	2. 8
Idaho.....	27, 366, 493	21, 637, 108	7, 520, 676	2, 227, 360	252, 130	11, 636, 972	-----	187. 9
Illinois.....	242, 002, 333	184, 251, 903	14, 239, 600	13, 313, 427	15, 695, 058	140, 912, 056	91, 762	735. 3
Indiana.....	129, 201, 066	97, 537, 876	12, 737, 894	5, 643, 256	5, 437, 173	73, 534, 003	165, 550	444. 8
Iowa.....	72, 809, 082	48, 546, 398	10, 820, 858	8, 218, 989	2, 564, 227	26, 942, 324	-----	911. 3
Kansas.....	67, 971, 724	45, 604, 631	10, 568, 940	7, 016, 951	2, 013, 332	25, 812, 098	193, 310	1, 045. 1
Kentucky.....	92, 150, 591	65, 194, 459	10, 488, 215	5, 427, 761	5, 381, 949	43, 896, 534	-----	230. 5
Louisiana.....	131, 867, 814	106, 978, 773	7, 275, 494	4, 362, 619	3, 174, 663	92, 165, 997	-----	179. 6
Maine.....	22, 510, 397	16, 305, 772	2, 471, 380	1, 854, 925	1, 018, 643	10, 585, 524	375, 300	72. 3
Maryland.....	69, 572, 981	54, 519, 712	4, 319, 875	1, 823, 216	1, 463, 363	46, 716, 680	196, 578	127. 0
Massachusetts.....	84, 025, 147	65, 941, 210	3, 971, 316	2, 099, 205	4, 565, 645	55, 275, 044	30, 000	66. 4
Michigan.....	175, 072, 330	138, 350, 508	11, 090, 313	8, 974, 241	16, 385, 628	91, 865, 326	35, 000	984. 9
Minnesota.....	119, 801, 172	87, 817, 667	10, 264, 911	8, 321, 668	4, 318, 646	64, 802, 349	410, 093	1, 101. 6
Mississippi.....	61, 048, 660	40, 668, 349	3, 960, 112	8, 402, 835	2, 319, 428	23, 964, 574	1, 400	740. 3
Missouri.....	152, 189, 257	111, 615, 014	17, 181, 293	8, 434, 147	7, 759, 885	71, 615, 610	6, 024, 079	1, 059. 1
Montana.....	62, 928, 374	50, 375, 076	8, 678, 482	7, 397, 017	1, 634, 196	31, 221, 886	2, 043, 495	642. 0
Nebraska.....	45, 381, 899	30, 447, 183	7, 066, 419	4, 422, 212	2, 049, 077	15, 734, 052	1, 175, 423	572. 9
Nevada.....	37, 578, 934	34, 803, 819	7, 865, 592	4, 612, 123	901, 949	18, 835, 854	2, 588, 301	216. 8
New Hampshire.....	20, 600, 239	15, 940, 158	1, 596, 428	637, 235	830, 679	12, 875, 816	-----	33. 8
New Jersey.....	108, 974, 634	79, 639, 540	4, 115, 069	3, 240, 253	14, 612, 698	57, 381, 520	90, 000	63. 3
New Mexico.....	47, 249, 484	40, 106, 786	7, 430, 653	4, 237, 498	410, 202	28, 028, 433	-----	225. 6
New York.....	277, 411, 704	200, 093, 831	18, 399, 625	7, 617, 804	21, 917, 572	151, 674, 830	484, 000	257. 6

North Carolina.....	77, 135, 333	47, 231, 495	9, 856, 732	13, 422, 232	5, 390, 432	18, 562, 099	1, 024, 036	292. 4
North Dakota.....	37, 145, 548	26, 405, 847	4, 473, 169	4, 730, 784	625, 817	15, 552, 041	-----	1, 402. 8
Ohio.....	341, 503, 215	277, 245, 864	17, 271, 167	7, 487, 848	20, 063, 453	232, 423, 396	-----	348. 1
Oklahoma.....	73, 631, 366	48, 097, 489	8, 575, 337	6, 914, 272	6, 304, 011	26, 303, 869	-----	568. 2
Oregon.....	85, 511, 533	60, 080, 843	5, 966, 734	3, 754, 583	2, 625, 539	47, 715, 196	27, 791	211. 7
Pennsylvania.....	185, 559, 554	125, 528, 319	22, 666, 497	10, 210, 213	16, 783, 087	75, 850, 522	18, 000	246. 3
Rhode Island.....	31, 999, 838	22, 487, 259	1, 728, 999	1, 493, 793	3, 836, 170	13, 376, 497	29, 800	23. 1
South Carolina.....	44, 738, 302	30, 291, 121	6, 226, 670	5, 569, 572	1, 313, 252	17, 181, 627	-----	708. 0
South Dakota.....	40, 912, 971	29, 475, 979	6, 402, 291	5, 203, 354	690, 974	16, 301, 590	877, 770	1, 144. 4
Tennessee.....	115, 301, 573	90, 576, 030	7, 084, 191	5, 610, 313	4, 276, 517	73, 005, 909	-----	572. 6
Texas.....	304, 402, 923	229, 935, 154	27, 816, 635	16, 340, 553	14, 208, 412	171, 563, 635	5, 919	1, 554. 3
Utah.....	52, 018, 220	47, 594, 171	5, 297, 795	3, 044, 860	1, 356, 605	37, 808, 665	86, 240	164. 2
Vermont.....	30, 338, 203	24, 997, 404	1, 435, 508	1, 365, 071	24, 882	22, 063, 441	108, 502	08. 2
Virginia.....	157, 111, 696	130, 052, 288	7, 124, 489	5, 219, 214	3, 850, 215	111, 639, 187	2, 219, 183	206. 6
Washington.....	104, 371, 760	79, 618, 823	5, 943, 813	5, 083, 871	2, 252, 164	65, 975, 064	362, 508	334. 8
West Virginia.....	38, 961, 345	31, 106, 725	1, 656, 792	1, 667, 585	1, 574, 024	26, 208, 324	-----	33. 0
Wisconsin.....	101, 000, 557	74, 593, 865	9, 354, 231	9, 192, 028	2, 452, 020	53, 135, 277	410, 309	592. 5
Wyoming.....	45, 004, 779	39, 090, 299	3, 297, 897	3, 574, 194	338, 168	31, 135, 514	744, 526	370. 5
District of Columbia.....	38, 350, 386	29, 808, 504	3, 849, 181	3, 236, 713	357, 294	22, 365, 316	-----	8. 6
Puerto Rico.....	18, 854, 416	9, 092, 223	3, 259, 031	1, 526, 362	4, 216, 830	-----	-----	29. 4
Total.....	4, 431, 839, 192	3, 715, 538, 926	438, 572, 174	286, 015, 790	240, 794, 983	2, 714, 417, 451	25, 738, 528	22, 034. 1

¹ Includes preliminary engineering, right-of-way, and force account projects on which work was started during the fiscal year. Columns may not add to totals due to rounding.

² Funds available for either rural or urban portions of the Federal-aid primary highway system.

³ Funds available for primary system in urban areas or for urban extensions of secondary system.

Table 5.—Status of Federal-aid projects ¹ as of June 30, 1963, including projects completed during the fiscal year

State or Territory	Programed, ² plans not approved			Plans approved, not under construction			Under construction			Completed during fiscal year		
	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles
Alabama.....	\$88,948,928	\$49,689,392	66.8	\$38,631,091	\$28,441,410	211.6	\$176,536,469	\$133,516,940	883.0	\$54,424,294	\$37,842,502	509.6
Alaska.....	36,709,900	34,764,301	246.4	12,431,415	11,640,148	58.9	79,888,530	71,423,394	343.6	16,766,332	16,755,063	100.2
Arizona.....	34,286,843	31,801,668	91.9	15,773,800	14,515,345	27.3	98,840,260	90,720,829	203.2	42,306,909	35,061,255	289.2
Arkansas.....	45,485,943	39,163,866	112.5	55,031,018	42,898,456	218.7	128,695,079	93,528,630	749.8	36,996,782	22,828,643	509.0
California.....	135,400,343	32,690,391	24.2	104,984,630	77,559,777	126.5	984,014,670	785,475,978	492.2	273,871,155	208,394,899	336.4
Colorado.....	38,055,131	22,370,450	99.8	2,852,930	1,614,226	19.0	74,477,376	56,624,940	286.4	47,297,067	33,544,676	369.2
Connecticut.....	3,604,575	2,153,318	8	10,477,937	6,624,537	4.7	183,162,013	145,495,327	47.2	12,609,077	8,206,238	5.5
Delaware.....	9,722,233	8,000,010	7.1	8,884,500	5,423,200	19.6	56,759,764	43,492,600	33.9	2,053,722	1,091,658	11.1
Florida.....	18,584,318	12,681,386	57.3	24,755,916	18,307,024	74.8	158,986,080	122,915,582	574.0	70,875,487	49,437,463	444.9
Georgia.....	60,704,232	48,581,097	124.1	47,840,468	39,437,239	82.1	311,967,052	239,739,952	1,033.8	78,975,932	52,373,189	430.2
Hawaii.....	7,208,200	4,252,100	11.7	13,760,347	8,351,790	8.1	17,694,363	11,783,507	10.9	4,815,661	3,494,021	1.3
Idaho.....	23,804,272	21,480,911	70.5	7,351,853	5,915,384	70.1	69,833,734	57,210,468	475.1	12,107,395	8,615,185	131.4
Illinois.....	25,086,772	21,146,493	6.9	95,080,911	74,310,621	154.8	507,830,840	397,322,327	976.5	219,584,454	160,804,688	630.3
Indiana.....	49,141,505	37,963,341	110.4	43,026,915	32,654,507	212.9	229,222,792	177,677,905	357.7	101,661,612	71,164,247	375.9
Iowa.....	9,117,512	7,012,251	51.8	22,751,916	15,810,028	118.2	107,467,487	75,388,585	1,130.6	54,202,172	36,201,334	972.9
Kansas.....	19,530,160	16,610,424	75.2	20,562,131	14,686,193	135.8	81,355,048	58,277,856	1,092.0	47,073,709	28,356,779	1,044.6
Kentucky.....	19,866,378	17,094,108	39.2	25,592,625	19,671,397	72.6	184,333,074	139,245,586	314.2	80,285,126	55,079,777	286.7
Louisiana.....	579,200	517,780	---	43,026,915	17,473,840	29.3	348,151,695	278,625,000	493.7	86,972,206	56,576,128	231.9
Maine.....	7,950,620	4,702,602	26.8	12,409,357	11,508,510	31.2	43,629,480	32,209,501	149.8	25,609,675	16,843,745	80.9
Maryland.....	59,179,334	48,010,466	66.1	12,610,558	7,888,355	17.8	138,353,368	107,852,456	200.6	52,714,217	40,747,677	110.6
Massachusetts.....	38,113,562	33,212,146	8.0	77,237,041	65,190,752	61.7	209,488,554	157,281,052	115.4	85,657,347	58,763,659	70.5
Michigan.....	19,231,697	14,356,061	63.5	14,669,209	7,637,992	56.7	346,512,590	239,819,721	1,241.8	194,961,625	113,619,603	884.1
Minnesota.....	34,647,933	31,360,094	19.4	48,800,084	39,625,456	171.8	295,172,722	235,871,315	1,379.6	59,902,708	39,235,491	969.3
Mississippi.....	53,089,594	45,013,732	207.4	15,679,564	11,763,577	52.2	119,615,271	85,779,000	1,148.0	60,562,152	42,174,350	665.8
Missouri.....	11,212,380	8,816,249	53.1	60,782,251	49,807,877	104.1	258,059,862	191,971,758	705.3	108,687,004	78,298,062	1,325.7
Montana.....	27,661,895	23,073,214	129.1	8,218,590	6,325,795	88.7	149,588,976	122,237,570	886.0	27,248,753	18,504,602	239.6
Nebraska.....	24,286,240	20,445,482	74.7	25,003,514	19,172,349	193.7	95,443,069	71,415,830	986.0	53,705,403	35,480,720	763.1
Nevada.....	15,700,000	15,012,645	28.5	7,947,381	7,560,848	34.2	77,261,393	72,266,296	243.6	20,425,743	18,679,230	156.7
New Hampshire.....	6,991,332	4,777,759	11.3	8,520,749	5,996,324	13.9	38,622,432	30,088,343	61.2	21,068,278	15,976,925	33.6
New Jersey.....	47,941,405	34,284,398	35.9	28,026,180	19,200,243	9.5	323,288,629	252,281,695	107.2	74,614,403	54,760,125	75.0
New Mexico.....	27,859,145	24,920,382	52.0	7,034,634	6,419,149	30.5	67,859,440	59,017,550	221.0	32,535,913	24,903,623	219.4
New York.....	9,823,520	5,340,430	6.7	188,852,164	143,178,325	58.6	838,350,373	601,408,361	558.8	148,799,122	79,250,126	292.1

North Carolina-----	32,362,111	20,807,485	64.2	7,176,350	4,570,960	29.2	142,850,172	95,700,879	466.6	61,650,734	36,082,727	417.8
North Dakota-----	9,212,100	8,238,190	48.5	5,369,203	4,400,763	33.6	56,017,130	37,404,520	1,341.5	16,695,950	11,303,714	606.3
Ohio-----	5,102,130	3,439,959	5.1	24,564,379	20,115,480	21.9	605,435,170	469,360,061	635.5	117,248,015	89,195,065	182.1
Oklahoma-----	19,092,944	15,157,502	52.0	35,843,041	24,219,647	118.7	96,740,070	66,292,560	742.7	59,529,099	38,947,725	663.5
Oregon-----	11,667,155	10,483,100	15.2	22,940,121	10,628,520	40.5	145,406,090	115,040,148	272.7	88,346,421	72,550,850	292.1
Pennsylvania-----	145,717,387	115,421,266	93.4	91,721,731	72,317,657	92.6	408,133,577	287,834,802	474.2	155,802,214	109,678,826	226.5
Rhode Island-----	2,266,700	1,628,990	-----	8,384,586	6,796,111	1.4	83,147,543	62,947,589	28.0	10,516,543	5,850,939	28.4
South Carolina-----	18,262,684	13,297,745	73.7	17,772,458	12,903,053	120.2	88,161,954	63,894,311	1,200.1	46,215,470	29,017,229	656.4
South Dakota-----	27,607,000	20,866,828	348.6	6,735,458	4,555,322	95.7	44,504,464	32,854,814	865.9	43,819,964	34,701,925	539.0
Tennessee-----	25,559,189	21,710,782	53.4	30,166,485	24,363,086	95.8	315,302,100	218,475,458	770.3	100,748,359	76,428,085	710.3
Texas-----	45,096,900	36,766,180	161.6	31,903,170	22,554,700	104.9	402,536,184	309,959,935	1,550.0	209,948,441	151,940,055	1,373.9
Utah-----	31,590,992	29,550,977	57.1	45,472,039	42,449,114	87.0	67,751,848	60,974,606	167.8	27,753,843	23,439,694	180.2
Vermont-----	4,903,759	4,112,403	-----	-----	-----	-----	48,612,362	39,534,634	101.1	28,687,961	22,299,959	55.2
Virginia-----	55,740,980	46,259,211	43.7	32,568,333	25,737,652	40.6	410,756,352	346,637,805	548.5	90,095,780	65,619,998	363.6
Washington-----	8,311,592	5,819,805	12.4	35,235,206	25,945,565	39.4	193,006,621	149,374,608	376.0	68,922,051	48,147,614	280.6
West Virginia-----	33,944,064	25,391,022	17.6	24,744,491	22,160,143	17.7	114,934,003	82,020,108	96.9	25,373,325	18,141,484	67.7
Wisconsin-----	6,484,869	5,155,681	.8	10,994,337	7,576,505	77.3	140,127,271	105,473,858	564.7	74,450,702	48,836,032	592.2
Wyoming-----	9,201,900	8,209,976	36.6	10,382,356	9,312,320	63.8	62,138,602	52,479,847	335.1	40,500,963	34,173,702	351.7
Dist. of Columbia-----	12,204,566	9,956,514	2.7	20,611,944	14,704,741	4.0	117,895,541	92,975,192	17.1	5,384,070	3,100,109	1.6
Puerto Rico-----	2,470,360	1,118,507	.5	387,600	102,393	-----	36,608,163	17,291,397	70.5	13,195,574	6,193,942	29.0
Total-----	1,485,327,384	1,124,574,069	3,060.0	1,550,460,367	1,192,487,024	3,719.8	10,389,737,413	7,999,052,027	28,187.3	3,455,150,354	2,463,302,367	20,383.3

¹ Includes projects financed from Federal-aid primary, secondary, urban, and Interstate funds. Columns may not add to totals due to rounding.

² Initial commitment of funds.

Table 6.—Mileage of Federal-aid highway projects completed during fiscal year 1963, by program and by number of lanes¹

State or Territory	Primary program			Secondary program ²	Urban program			Interstate program		
	2 lanes	4 lanes	6 lanes or more		2 lanes	4 lanes	6 lanes or more	2 lanes	4 lanes	6 lanes or more
Alabama.....	43.6	0.2	-----	362.7	11.7	0.1	-----	87.7	3.6	-----
Alaska.....	46.5	-----	-----	153.6	-----	-----	-----	-----	-----	-----
Arizona.....	68.7	-----	0.3	154.3	1.8	5.7	-----	20.3	37.8	-----
Arkansas.....	89.2	.3	-----	393.8	4.4	2.2	-----	16.9	2.0	-----
California.....	34.0	-----	-----	196.4	13.9	1.6	2.0	26.4	7.2	55.0
Colorado.....	138.0	7.3	-----	149.7	2.1	5.2	1.6	3.7	57.6	3.9
Connecticut.....	1.3	-----	-----	.8	2.0	-----	-----	.7	.7	-----
Delaware.....	.1	-----	-----	10.8	.1	-----	-----	-----	-----	-----
Florida.....	81.9	40.6	-----	239.8	2.7	9.6	-----	13.0	52.8	4.4
Georgia.....	96.8	1.6	-----	333.5	12.2	2.9	-----	32.8	-----	.6
Hawaii.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Idaho.....	13.3	-----	1.3	138.2	-----	-----	-----	-----	-----	-----
Illinois.....	126.9	14.2	-----	397.8	18.1	9.8	-----	54.8	1.2	7.6
Indiana.....	158.1	52.9	-----	94.4	8.9	2.6	-----	41.9	16.9	-----
Iowa.....	191.4	1.9	-----	711.9	4.3	2.9	-----	13.2	47.2	.1
Kansas.....	294.0	17.1	-----	682.8	.9	6.2	-----	3.5	40.0	-----
Kentucky.....	56.0	6.9	-----	148.5	5.8	3.1	-----	32.9	33.4	-----
Louisiana.....	53.5	6.0	-----	84.9	11.1	6.1	-----	53.9	15.3	.9
Maine.....	28.3	3.6	-----	33.3	1.2	1.8	-----	6.7	5.9	-----
Maryland.....	16.2	5.5	-----	58.2	4.7	1.4	.1	21.9	.9	1.6
Massachusetts.....	13.7	-----	-----	19.2	14.0	-----	1.1	18.5	-----	4.0
Michigan.....	190.7	14.5	-----	637.8	1.9	3.4	2.9	16.9	107.9	8.1
Minnesota.....	261.5	17.8	-----	628.9	11.2	2.0	-----	32.9	14.8	.2
Mississippi.....	189.7	13.9	-----	384.4	8.2	2.5	-----	78.2	29.0	-----
Missouri.....	116.0	2.8	-----	1,138.6	4.6	.5	-----	56.8	6.3	-----
Montana.....	88.5	3.4	-----	125.8	4.7	-----	-----	17.2	-----	-----
Nebraska.....	163.5	1.4	-----	542.4	3.1	.1	-----	29.1	20.5	3.0
Nevada.....	71.9	-----	-----	37.8	-----	-----	-----	21.0	26.0	-----
New Hampshire.....	7.8	-----	-----	12.5	.7	-----	-----	8.2	4.3	-----
New Jersey.....	16.7	5.2	-----	26.0	6.2	5.0	1.1	10.3	1.5	3.0
New Mexico.....	65.4	3.3	-----	86.2	1.5	-----	-----	35.9	25.5	-----
New York.....	128.6	.8	-----	98.8	33.9	1.5	3.7	24.9	-----	-----

North Carolina.....	101.1	27.2	206.7	1.9	.3	66.6	10.4
North Dakota.....	128.1	-----	445.4	-----	-----	8.0	24.8
Ohio.....	3.1	-----	171.2	3.9	.5	1	3.0
Oklahoma.....	148.8	39.1	385.9	4.4	3.4	27.6	54.1
Oregon.....	49.0	.5	102.6	-----	-----	-----	-----
Pennsylvania.....	59.8	5.2	93.5	.7	1.2	101.3	37.3
Rhode Island.....	10.7	8.8	6.9	-----	8.5	38.3	20.5
South Carolina.....	124.0	8.1	473.3	9.3	.9	21.7	1.9
South Dakota.....	158.3	5.9	294.5	-----	.8	48.9	30.7
Tennessee.....	62.6	9.2	487.6	3.2	.4	78.1	73.6
Texas.....	339.9	80.4	765.8	11.6	14.8	73.4	83.0
Utah.....	75.9	2.9	66.4	.6	-----	1.5	27.9
Vermont.....	19.1	-----	12.7	-----	-----	15.3	8.0
Virginia.....	73.6	1.5	185.4	11.6	.7	86.2	3.0
Washington.....	65.0	10.4	162.8	.7	3.1	13.7	10.8
West Virginia.....	13.3	-----	22.4	-----	1.4	30.7	-----
Wisconsin.....	129.3	71.4	310.5	3.3	.6	7.8	64.9
Wyoming.....	37.7	8.6	127.0	.1	-----	67.3	111.0
Dist. of Columbia.....	1.3	-----	1.2	-----	-----	-----	-----
Puerto Rico.....	13.5	-----	14.6	.9	-----	-----	-----
Total.....	4,446.1	500.7	12,319.6	248.2	114.4	1,466.8	1,140.3
					23.0		122.7

¹ Columns may not add to totals due to rounding. ² Total mileage completed, principally 2-lane construction.

Table 7.—Lane classification of mileage of Federal-aid highway projects completed during fiscal year 1963, by class of fund

Number of lanes	Mileage				Total lane miles ¹
	Primary	Secondary	Urban	Interstate	Total
2-lane.....	4,446.1	² 12,319.6	248.2	1,466.8	18,480.7
4-lane.....	500.7	-----	114.4	1,140.3	7,021.6
6 lanes and over.....	1.5	-----	23.0	122.7	1,755.4
Total.....	4,948.3	12,319.6	385.6	2,729.8	44,866.2

¹ 6-lane and over converted to lane mileage on the basis of 6 lanes. ² Total mileage completed, principally 2-lane construction.

Table 8.—Apportionment of Federal-aid highway funds authorized for the fiscal year ending June 30, 1964

State or Territory	ABC program				Interstate System (\$2,600,000,000)	Total (\$3,550,000,000)
	Primary (\$427,500,000)	Secondary (\$285,000,000)	Urban (\$237,500,000)	Subtotal (\$950,000,000)		
Alabama.....	88,085,904	\$6,182,673	\$3,188,336	\$17,456,913	\$53,635,975	\$71,091,988
Alaska.....	22,885,367	15,327,203	35,155,712	35,155,712	36,407,150	38,321,282
Arizona.....	6,185,829	4,010,494	1,772,951	11,969,274	27,138,475	48,376,424
Arkansas.....	6,097,590	4,853,851	1,292,286	12,243,727	31,503,225	39,382,202
California.....	21,652,107	10,013,735	25,672,496	57,338,338	247,917,800	305,256,138
Colorado.....	7,101,115	4,606,555	2,414,608	14,122,278	34,378,825	48,501,103
Connecticut.....	3,045,676	1,656,988	4,581,477	9,284,141	36,612,530	43,896,691
Delaware.....	2,110,781	1,407,187	544,458	4,062,426	9,653,800	13,716,226
Florida.....	7,779,118	4,815,902	6,668,740	19,263,760	63,789,125	73,062,885
Georgia.....	10,709,068	8,065,525	3,843,060	22,617,653	47,781,175	70,398,828
Hawaii.....	2,110,781	1,407,187	3,880,283	4,398,251	20,360,275	24,758,526
Idaho.....	4,722,011	3,388,749	501,310	8,612,070	12,169,950	20,782,020
Illinois.....	15,908,454	8,750,018	15,229,044	39,947,516	135,255,900	175,203,416
Indiana.....	9,652,474	6,979,435	5,321,635	21,953,544	64,213,175	86,166,719
Iowa.....	9,593,793	7,113,476	2,535,283	19,274,552	32,812,650	52,087,202
Kansas.....	9,557,916	6,674,220	2,827,141	18,559,277	20,103,525	38,662,802
Kentucky.....	6,923,936	5,874,348	2,367,652	15,165,936	52,890,500	68,056,436
Louisiana.....	6,377,021	4,585,842	3,712,211	14,673,074	74,893,975	89,569,049
Maine.....	3,143,060	2,387,259	804,850	6,336,139	12,246,975	18,582,114
Maryland.....	4,264,822	2,676,699	4,288,454	11,229,975	47,498,750	58,728,725
Massachusetts.....	5,386,941	2,383,617	8,183,886	15,954,444	55,560,700	71,515,144
Michigan.....	13,241,895	8,318,348	10,755,393	32,315,636	101,031,125	133,346,761
Minnesota.....	10,734,691	7,566,026	3,888,110	22,188,827	67,063,100	89,251,927
Mississippi.....	6,618,222	5,561,704	1,392,843	13,572,769	31,503,225	45,075,994
Missouri.....	11,266,556	7,713,554	5,270,233	24,250,343	66,318,525	90,568,868
Montana.....	7,821,766	5,426,106	5,542,680	13,790,802	24,262,875	38,053,677
Nebraska.....	7,686,520	5,476,050	1,367,646	14,529,216	15,148,250	29,677,466
Nevada.....	4,871,838	3,240,252	357,801	8,469,891	13,068,575	21,538,466
New Hampshire.....	2,110,781	1,407,187	627,348	4,145,316	11,630,775	15,776,091
New Jersey.....	5,962,020	2,044,966	10,190,574	18,197,560	67,602,275	85,799,835
New Mexico.....	6,467,592	4,364,611	1,146,544	11,978,747	28,880,400	37,859,147
New York.....	19,172,836	8,332,376	27,315,513	54,820,725	122,854,875	177,675,600

North Carolina.....	9,490,582	8,886,438	3,110,802	21,927,832	21,207,550	43,135,382
North Dakota.....	5,383,972	3,946,473	416,641	9,747,086	11,451,050	21,198,136
Ohio.....	14,789,284	9,224,354	13,402,297	37,415,935	176,952,100	214,368,035
Oklahoma.....	8,496,500	5,914,170	2,616,121	17,026,791	31,195,125	48,221,916
Oregon.....	6,528,584	4,563,109	1,981,500	13,073,193	45,033,950	58,107,143
Pennsylvania.....	15,715,863	10,078,643	15,094,456	40,888,962	115,973,975	156,802,437
Rhode Island.....	2,110,781	1,407,187	1,425,939	4,943,037	9,551,100	14,495,037
South Carolina.....	5,409,816	4,726,329	1,698,530	11,834,075	22,388,900	34,223,275
South Dakota.....	5,942,523	4,300,016	431,189	10,673,728	17,022,525	27,696,253
Tennessee.....	8,323,813	6,567,024	3,378,304	18,290,201	65,312,875	83,612,076
Texas.....	25,770,827	16,253,307	13,180,455	53,234,589	117,300,075	172,543,664
Utah.....	4,647,238	3,014,802	1,237,133	8,890,173	37,536,850	46,456,023
Vermont.....	2,110,781	1,407,187	329,669	3,817,637	17,895,475	21,743,112
Virginia.....	8,287,423	6,439,440	4,111,778	18,838,641	78,796,575	97,635,216
Washington.....	6,776,836	4,580,076	3,547,795	14,904,707	54,046,875	68,950,582
West Virginia.....	4,148,403	3,731,930	1,248,201	9,128,534	39,026,000	48,154,534
Wisconsin.....	9,484,657	6,690,955	4,588,651	20,764,263	22,927,775	43,692,038
Wyoming.....	4,816,374	3,277,053	279,838	8,373,265	24,879,075	33,252,340
District of Columbia.....	2,110,781	1,407,187	1,488,788	5,006,756	37,280,100	42,286,856
Puerto Rico.....	2,110,781	2,347,677	1,822,235	6,280,693	-----	6,280,693

Table 9.—Federal highway funds paid by Bureau of Public Roads during fiscal year ended June 30, 1963, by program and by State¹

State or Territory	Primary ²	Secondary	Urban ³	Subtotal	Interstate	D fund ⁴	L fund ⁴	Total
Alabama.....	\$5,792,675	\$5,621,773	\$3,659,017	\$15,073,465	\$25,047,227	---	---	\$40,120,692
Alaska.....	12,131,736	9,427,454	116,659	21,675,849	---	\$8,104	---	21,683,953
Arizona.....	5,837,594	4,538,670	925,192	11,301,456	32,603,397	---	---	43,904,853
Arkansas.....	9,441,381	6,661,941	780,506	16,883,828	20,837,255	---	---	37,721,083
California.....	14,097,306	8,489,195	23,668,503	46,255,004	205,781,096	---	---	252,036,100
Colorado.....	8,001,603	3,385,969	3,140,871	14,528,443	23,631,002	---	---	38,159,444
Connecticut.....	748,122	1,335,134	2,109,662	4,242,918	24,422,773	---	---	28,665,691
Delaware.....	588,167	1,174,206	457,642	2,220,015	11,630,622	---	---	13,850,637
Florida.....	7,717,255	6,608,773	2,650,952	17,036,480	36,276,452	---	---	53,312,932
Georgia.....	9,973,439	6,735,549	3,504,147	20,176,135	42,910,125	---	---	63,143,466
Hawaii.....	3,469,175	490,286	520,700	4,801,161	1,411,744	---	\$57,206	5,891,905
Idaho.....	4,094,478	3,082,837	16,019	7,193,334	17,191,962	---	---	24,385,296
Illinois.....	12,975,048	10,141,400	13,730,211	36,846,619	123,999,464	---	---	160,846,123
Indiana.....	11,665,465	6,357,780	7,536,873	25,590,118	46,955,592	451,698	150,566	73,147,974
Iowa.....	6,528,060	6,641,094	1,903,997	15,073,151	18,952,967	---	---	34,056,118
Kansas.....	8,683,981	5,177,981	1,251,813	15,113,775	12,308,141	---	---	27,421,916
Kentucky.....	8,161,206	6,567,004	3,977,370	18,705,580	47,374,429	---	---	66,080,009
Louisiana.....	8,152,905	4,203,272	4,049,894	16,406,071	58,687,094	---	---	75,093,165
Maine.....	3,946,040	2,355,732	1,378,450	7,680,222	12,476,585	---	---	20,156,807
Maryland.....	4,216,463	886,169	2,998,353	8,100,985	29,555,142	---	---	37,656,127
Massachusetts.....	4,226,077	728,605	6,952,886	11,907,568	41,146,077	---	---	53,053,645
Michigan.....	14,821,537	7,923,832	14,249,743	36,995,112	83,979,562	139,987	---	121,114,691
Minnesota.....	11,226,129	4,790,886	2,591,082	18,608,097	45,147,014	---	---	63,755,111
Mississippi.....	6,664,488	6,110,905	1,519,204	14,294,657	24,889,199	---	---	39,183,586
Missouri.....	8,672,338	7,747,009	3,848,303	20,267,650	58,692,277	---	---	78,959,927
Montana.....	6,684,859	5,771,428	498,573	12,954,800	26,397,979	---	---	39,352,839
Nebraska.....	5,771,524	6,804,204	1,135,980	13,711,708	24,702,369	---419	---	38,413,658
Nevada.....	3,704,122	3,399,912	83,371	7,187,405	9,983,944	---	---	17,171,349
New Hampshire.....	1,205,326	1,150,069	719,308	3,074,703	10,413,295	19	---	13,488,017
New Jersey.....	3,028,440	2,246,366	7,095,877	12,370,683	54,751,817	---	---	67,122,500
New Mexico.....	6,451,249	4,351,048	885,502	11,687,799	21,903,236	---	---	33,591,035
New York.....	21,763,833	7,236,999	36,640,858	65,041,690	96,785,808	247,994	---16,955	162,658,537

North Carolina.....	10,240,440	8,736,992	2,212,873	21,100,305	16,731,659	-----	37,921,974
North Dakota.....	3,880,448	4,209,088	2,241,139	8,336,675	8,763,611	-----	17,102,316
Ohio.....	21,291,315	10,749,411	16,365,375	48,406,131	123,405,130	-----	171,811,261
Oklahoma.....	9,006,391	5,616,743	3,010,716	17,663,850	17,150,529	11,332	31,829,210
Oregon.....	6,305,138	3,992,138	2,426,457	12,723,733	46,177,314	-----	58,901,047
Pennsylvania.....	21,213,217	10,474,324	13,901,874	45,589,415	91,562,739	-----	137,152,154
Rhode Island.....	2,350,382	898,719	729,336	3,978,437	11,163,171	-----	15,141,608
South Carolina.....	4,095,988	3,815,652	2,155,413	10,067,053	16,529,567	5,462	26,533,082
South Dakota.....	3,693,570	3,371,465	458,747	7,523,782	14,902,912	-----	22,426,694
Tennessee.....	9,567,431	6,315,077	4,053,966	19,966,474	77,394,673	-----	97,361,147
Texas.....	19,222,900	13,832,940	14,432,200	47,488,000	117,045,100	-----	164,533,100
Utah.....	5,980,276	3,806,604	852,000	10,638,880	22,448,905	-----	33,087,785
Vermont.....	2,251,546	998,853	537,889	3,788,288	14,409,507	-----	18,197,795
Virginia.....	7,480,222	6,443,113	3,393,182	17,316,517	74,900,219	-----	91,816,736
Washington.....	6,924,588	4,188,688	5,062,699	16,175,975	42,444,614	-----	58,620,589
West Virginia.....	1,936,922	2,625,994	1,273,897	5,836,813	11,916,976	5,610	17,761,269
Wisconsin.....	11,688,594	7,627,772	5,700,714	25,017,080	33,056,138	-----	58,073,218
Wyoming.....	5,358,186	4,438,216	484,682	10,281,084	26,463,038	-----	36,744,122
District of Columbia.....	1,684,561	1,675,742	1,955,290	5,315,523	25,846,359	-----	31,161,882
Puerto Rico.....	1,759,187	1,918,931	2,000,372	5,738,490	-----	246,592	6,245,456
Total.....	396,319,323	264,102,434	235,906,329	806,328,086	2,082,780,877	1,116,379	2,980,681,902

¹ Columns may not add to totals due to rounding.

² Funds available for either rural or urban portions of the Federal-aid primary high-

way system.

³ Funds available for primary system in urban areas or for urban extensions of secondary system.

⁴ Provided by secs. 2(a) and 2(c) of the Federal-Aid Highway Act of 1958.

Table 10.—Balances of Federal-aid funds available to States for projects not yet programmed, as of June 30, 1963¹

State or Territory	Primary ²	Secondary	Urban ³	Subtotal	Interstate	Total
Alabama.....	\$706,777	\$988,310	\$338,341	\$2,033,428	\$41,581,904	\$43,615,332
Alaska.....	17,346,324	6,562,955	364,108	24,273,387	24,273,387	24,273,387
Arizona.....	102,578	1,539,306	1,450,098	3,092,282	9,475,295	12,567,577
Arkansas.....	1,891,981	2,194,822	531,726	4,618,529	6,485,242	11,103,771
California.....	49,896	11,010,575	12,162,957	23,223,428	98,700,381	121,923,809
Colorado.....	3,209,259	4,366,820	1,210,799	8,786,878	23,180,127	31,967,005
Connecticut.....	5,020,238	1,882,744	5,977,847	12,880,829	534,026	13,414,855
Delaware.....	3,993,914	2,020,131	1,287,692	7,301,737	16,448,059	23,749,796
Florida.....	374,772	4,124,365	12,361,144	16,860,281	22,283,927	39,144,208
Georgia.....	7,072,135	5,636,375	15,399,980	27,108,490	6,970,753	34,079,243
Hawaii.....	2,171,424	910,380	497,363	3,579,167	36,372,887	39,952,054
Idaho.....	310,332	3,968,385	361,797	4,640,514	8,725,291	13,365,805
Illinois.....	4,750,104	1,662,622	1,217,559	7,630,285	20,736,772	28,367,057
Indiana.....	1,060,009	2,461,291	1,706,584	5,227,884	74,560,249	79,788,133
Iowa.....	591,470	676,576	1,716,486	3,104,532	19,563,390	21,279,876
Kansas.....	666,060	4,482,379	3,541,650	8,690,089	8,236,707	16,926,796
Kentucky.....	301,191	383,319	545,880	1,230,390	18,527,998	19,758,388
Louisiana.....	25,918	18,439	14,146	58,503	16,904,058	16,962,561
Maine.....	2,195,939	790,083	710,645	3,697,267	7,765,652	11,462,919
Maryland.....	2,190,665	5,091,654	3,982,664	11,264,983	51,337,578	62,602,561
Massachusetts.....	4,783,688	2,695,840	4,672,606	12,152,134	9,170,596	21,322,730
Michigan.....	749,028	5,633,444	593,623	6,976,095	53,567,852	60,543,947
Minnesota.....	137,575	2,173,470	88,839	2,399,884	5,097,703	7,497,587
Mississippi.....	782,511	2,346,766	108,165	3,237,442	7,835,585	11,072,977
Missouri.....	420,143	2,245,371	1,562,125	4,227,639	23,599,633	27,827,272
Montana.....	5,068,460	1,657,670	834,427	7,560,557	31,930,294	39,520,851
Nebraska.....	2,428,910	2,678,919	2,025,150	7,122,979	2,038,923	9,171,902
Nevada.....	1,129,422	2,395,933	67,029	3,592,384	5,572,749	9,165,133
New Hampshire.....	1,580,144	990,431	669,488	3,240,063	1,694,770	4,934,833
New Jersey.....	11,378,251	1,634,697	9,996,734	23,009,682	85,064,004	108,073,686
New Mexico.....	2,839,111	1,122,803	2,267,525	6,229,439	11,819,501	18,048,940
New York.....	307,853	8,436,507	1,694,212	10,438,572	10,671,513	21,110,085

North Carolina.....	1,829,599	2,746,680	1,675,654	6,251,943	19,185,981	25,437,874
North Dakota.....	495,282	711,455	196,830	1,403,567	7,276,146	8,679,713
Ohio.....	1,059,314	4,119,055	2,801,373	8,039,742	9,823,073	17,862,815
Oklahoma.....	463,089	2,549,552	55,707	3,065,348	23,811,109	26,877,457
Oregon.....	472,063	2,450,592	713,555	3,636,210	9,506,625	13,282,735
Pennsylvania.....	5,008,286	6,637,746	14,573,622	26,279,634	65,679,870	91,959,534
Rhode Island.....	1,841,257	935,051	263,808	3,062,176	1,279,544	4,341,720
South Carolina.....	1,766,796	4,145,200	739,447	6,035,443	7,199,050	13,834,443
South Dakota.....	381,000	4,065,897	660,225	5,107,122	1,287,722	6,394,844
Tennessee.....	3,755,195	7,926,371	1,805,043	13,546,669	15,648,405	29,194,714
Texas.....	3,285,554	15,970,503	335,674	19,591,731	17,443,610	37,035,341
Utah.....	814,647	4,215	286,446	1,105,308	1,317,185	2,422,493
Vermont.....	1,051,559	254,246	690,125	1,995,930	23,025,410	25,021,370
Virginia.....	1,895,948	1,900,262	2,408,802	6,205,012	38,857,271	45,062,283
Washington.....	1,988,689	2,320,720	1,844,892	6,154,301	18,027,795	24,782,096
West Virginia.....	5,726,612	4,569,997	2,084,330	12,380,639	53,044,636	65,425,575
Wisconsin.....	333,665	4,500,181	1,294,032	6,127,878	1,317,170	7,445,048
Wyoming.....	1,194,222	509,990	1,154,908	1,859,180	12,723,569	14,582,749
Dist. of Columbia.....	3,072,973	950,621	2,121,833	6,145,427	44,658,943	50,804,370
Puerto Rico.....	6,178,252	4,284,949	1,523,058	11,986,289	-----	11,986,289
Total.....	128,322,397	166,357,276	112,334,299	407,013,972	1,108,256,063	1,515,270,035

¹ Columns may not add to totals due to rounding.

² Funds available for either rural or urban portions of the Federal-aid primary highway system.

³ Funds available for primary system in urban areas or for urban extensions of secondary system.

Table 11.—National System of Interstate and Defense Highways: Improvement status of mileage as of June 30, 1963

State	Work in progress			Open to traffic				Total design- ated system mileage
	Preliminary status or not yet in progress ¹	Engineering or right- of-way	Under con- struction	Total under way	Toll facilities	Improved to standards adequate for present traffic ²	Completed to full or acceptable standards ³	Total open to traffic
Alabama.....	266.0	228.3	139.6	367.9		51.5	189.2	874.6
Alaska.....								
Arizona.....	221.6	338.6	42.5	381.1		251.2	307.1	1,161.0
Arkansas.....	13.8	277.9	152.2	430.1		2.8	73.3	520.0
California.....	78.8	1,167.2	190.4	1,357.6	14.0	382.7	343.4	2,176.5
Colorado.....	326.5	245.7	64.0	309.7		96.3	215.5	311.8
Connecticut.....	1.3	72.1	57.6	129.7	19.3	23.0	122.2	164.3
Delaware.....		19.4	17.6	37.0	2.3		1.2	40.5
Florida.....	495.3	198.0	203.0	401.0	42.4		197.3	1,136.0
Georgia.....	247.7	354.9	232.0	586.9		75.2	193.8	1,103.6
Hawaii.....	28.2	14.5		14.5		5.8		48.5
Idaho.....	97.2	229.0	67.2	296.2		53.5	165.2	612.1
Illinois.....	304.1	496.4	133.7	630.1	155.1	153.9	344.8	1,588.0
Indiana.....	146.2	491.2	130.2	621.4	156.9	10.2	186.2	1,120.9
Iowa.....	189.8	165.2	80.8	246.0	3.6	22.2	247.4	273.3
Kansas.....	165.3	121.5	69.2	190.7	187.1	35.8	222.2	801.1
Kentucky.....	90.1	338.9	97.6	436.5	39.6	16.4	121.4	704.0
Louisiana.....	120.9	295.7	179.2	474.9		6.3	80.5	682.6
Maine.....	120.3	33.5	38.3	71.8	39.6	3.0	56.7	311.4
Maryland.....	22.1	94.9	80.7	175.6	10.5	69.7	75.9	353.8
Massachusetts.....	46.2	95.1	83.2	178.3	126.3	28.4	68.8	228.5
Michigan.....	216.9	66.8	167.1	233.9	4.8	5.6	616.6	627.0
Minnesota.....	291.2	358.3	99.3	457.6		62.7	149.3	898.1
Mississippi.....	171.6	170.5	178.5	349.0		26.9	130.7	678.2
Missouri.....	1.3	480.1	136.0	616.1	3.2	199.9	284.2	1,104.7
Montana.....	573.4	263.1	138.9	402.0			205.0	1,180.4
Nebraska.....	104.0	193.7	103.1	296.8	0.3	12.9	89.1	489.9
Nevada.....	142.2	165.0	84.3	249.3		17.5	125.3	534.3
New Hampshire.....	72.9	16.8	20.8	37.6	21.6	7.2	74.5	213.8
New Jersey.....	121.3	91.6	40.7	132.3	54.2	32.4	36.7	373.9
New Mexico.....	410.2	161.0	107.7	268.7		95.5		1,006.9
New York.....	125.6	219.4	93.8	313.2	494.4	24.7	269.3	1,227.2

North Carolina.....	172.1	140.6	66.4	207.0	78.7	310.3	389.0	768.1
North Dakota.....	215.0	78.2	46.5	124.7	39.4	188.8	228.2	567.9
Ohio.....	84.5	503.7	252.1	755.8	62.6	412.2	681.3	1,521.6
Oklahoma.....	127.6	144.5	68.2	212.7	48.0	231.5	453.9	1,794.2
Oregon.....	73.9	60.1	72.5	132.6	194.4	330.3	525.5	732.0
Pennsylvania.....	279.0	408.7	168.8	577.5	1.7	365.2	719.0	1,575.5
Rhode Island.....	8.3	31.6	9.0	40.6	0.3	22.0	71.2	22.3
South Carolina.....	241.9	78.1	73.0	151.1	41.2	244.5	285.7	678.7
South Dakota.....	233.1	160.3	62.1	222.4	54.6	168.7	223.3	678.8
Tennessee.....	330.2	304.1	244.1	548.2	39.7	129.5	169.2	1,047.6
Texas.....	624.3	843.6	338.9	1,182.5	313.2	881.9	1,225.2	3,032.0
Utah.....	476.8	276.5	82.0	358.5	26.7	72.9	99.6	393.9
Vermont.....	167.5	57.5	46.7	104.2	52.2	52.2	52.2	323.9
Virginia.....	344.4	233.3	231.8	465.1	43.2	161.4	243.6	1,053.1
Washington.....	129.2	199.5	96.3	295.8	192.9	107.4	300.6	1,725.6
West Virginia.....	278.0	84.3	32.1	116.4	85.9	50.4	136.3	530.7
Wisconsin.....	412.5	145.7	69.6	215.3	39.5	197.7	237.2	452.5
Wyoming.....	15.8	90.5	96.5	187.0	58.0	258.6	316.6	916.1
District of Columbia.....	144.7	3.1	6.2	9.3	1.9	1.6	3.5	2 144.7
Pending.....								
Total.....	9,570.8	11,308.2	5,292.0	16,600.2	3,009.2	9,525.5	14,829.0	41,000.0

¹ Location studies and public hearings have been undertaken on many portions of the mileage in this column.

² Includes 1,386.6 miles improved with Interstate and State matching funds and 601.7 miles improved with other public funds.

³ Includes 8,923.8 miles improved with Interstate and State matching funds and 601.7 miles improved with other public funds.

⁴ Includes routes for which the final locations have not yet been determined.

Table 12.—Status of Interstate System improvement as of June 30, 1963, financed with Federal-aid funds,¹ including projects completed during the fiscal year

State or Territory	Programed, ² plans not approved			Plans approved, not under construction			Under construction			Completed during fiscal year		
	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles
Alabama-----	\$94,602,270	\$47,589,453	57.9	\$23,472,670	\$21,102,273	41.3	\$117,275,105	\$104,149,142	111.8	\$28,561,473	\$25,695,994	91.3
Alaska-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Arizona-----	28,459,843	27,299,656	62.3	13,660,962	12,888,643	24.9	82,803,637	78,255,802	147.7	20,178,288	18,969,091	38.2
Arkansas-----	40,459,953	36,415,250	96.8	38,662,100	34,795,251	113.2	78,004,551	69,428,478	114.5	10,856,597	9,762,128	18.9
California-----	116,119,874	21,984,317	14.3	61,488,149	54,957,102	66.2	781,219,686	683,323,386	204.3	176,832,575	155,310,053	88.5
Colorado-----	20,223,957	18,468,553	48.6	100	100	-----	49,256,247	42,292,414	97.9	18,491,763	16,524,842	65.2
Connecticut-----	877,575	789,818	-----	4,116,985	3,697,098	1.0	142,613,558	125,445,051	20.8	6,090,188	6,034,258	1.4
Delaware-----	7,806,833	7,026,150	.5	2,468,000	2,221,200	.9	47,402,937	40,861,614	3.4	171,542	154,438	-----
Florida-----	8,254,318	7,428,886	13.6	15,026,902	13,518,528	24.0	108,495,757	97,588,959	170.5	37,451,660	33,480,730	70.3
Georgia-----	45,133,954	40,674,588	34.6	38,777,661	34,869,893	43.8	213,196,140	189,843,459	229.5	34,761,538	31,153,635	33.3
Hawaii-----	1,620,000	1,458,000	-----	4,461,651	3,869,965	1.0	7,843,184	7,058,866	-----	2,080,353	2,597,497	-----
Idaho-----	21,921,269	20,268,946	53.0	4,363,117	4,028,438	18.4	42,031,693	38,963,461	171.5	2,212,682	2,009,045	-----
Illinois-----	21,379,837	19,289,154	2.3	63,857,048	56,618,917	60.9	365,250,172	323,457,189	176.2	140,476,395	120,790,000	63.5
Indiana-----	33,269,845	29,943,561	35.7	27,896,432	25,106,788	35.7	177,162,689	140,338,160	118.4	50,443,046	45,397,536	59.0
Iowa-----	5,401,616	4,890,568	12.8	11,272,682	10,197,572	21.2	52,856,136	47,602,572	96.9	22,010,902	19,880,968	60.4
Kansas-----	17,060,360	15,354,324	71.3	10,991,966	9,888,843	44.4	43,583,957	39,142,414	67.5	12,212,155	10,909,664	43.6
Kentucky-----	17,892,463	16,103,217	38.9	17,218,439	15,481,923	45.5	121,998,791	108,551,589	71.3	39,753,419	34,944,491	66.3
Louisiana-----	553,200	497,880	-----	17,536,770	15,782,580	18.0	275,126,809	242,598,620	101.6	61,798,920	55,520,033	70.2
Maine-----	1,796,150	1,616,536	-----	12,643,479	11,379,571	28.1	24,766,349	22,247,165	43.8	10,354,475	9,345,079	12.6
Maryland-----	46,098,874	41,305,886	34.6	4,167,901	3,521,726	1.2	108,036,897	92,781,873	39.8	38,409,027	33,685,185	24.4
Massachusetts-----	35,388,048	31,849,390	4.2	68,837,735	61,132,230	54.4	136,699,400	121,418,068	47.9	42,905,885	37,754,573	22.5
Michigan-----	11,772,779	10,395,502	4.1	1,618,570	1,367,710	.8	218,994,739	197,109,738	188.5	92,151,000	82,243,216	133.0
Minnesota-----	34,568,733	31,312,094	19.4	38,731,282	34,566,901	60.3	226,213,545	201,343,332	136.4	23,882,490	20,777,027	47.8
Mississippi-----	45,205,119	40,923,069	145.6	9,556,239	8,515,754	31.7	68,170,948	61,102,016	134.8	29,929,835	26,952,856	107.2
Missouri-----	7,944,880	7,182,499	4.1	48,217,725	43,489,435	67.6	159,101,178	142,421,527	161.6	58,241,393	52,595,179	63.1
Montana-----	20,905,525	19,164,799	44.9	4,800,129	4,389,938	17.8	99,709,714	91,235,545	200.1	8,150,944	7,521,058	17.5
Nebraska-----	20,128,995	18,361,495	34.4	16,186,330	14,567,697	80.1	57,787,401	52,055,059	113.4	19,497,864	17,889,662	52.6
Nevada-----	14,650,000	14,070,500	21.0	7,151,640	6,847,389	20.8	57,050,990	54,203,041	72.0	10,996,060	10,297,481	47.0
New Hampshire-----	4,355,232	3,919,709	6.3	4,348,422	3,913,576	4.2	28,528,194	25,178,546	23.0	14,422,656	12,672,918	12.5
New Jersey-----	26,845,029	23,734,760	11.7	13,403,690	11,910,348	4.3	240,809,077	211,094,958	35.2	45,510,290	42,281,315	14.8
New Mexico-----	24,692,701	22,809,585	34.5	6,555,883	6,112,554	28.3	50,576,867	47,024,246	77.3	13,918,259	12,572,120	61.4
New York-----	6,126,440	3,496,680	2.3	142,616,456	121,371,992	34.8	524,181,277	454,410,362	104.9	30,393,021	26,055,853	24.9

North Carolina-----	11,433,971	10,333,785	20.1	2,560,496	2,304,425	1.6	59,812,653	53,841,629	104.4	16,729,954	13,704,983	77.1
North Dakota-----	8,535,100	7,874,390	44.2	4,254,233	3,843,666	29.4	22,333,165	20,297,912	76.4	7,362,130	6,634,137	32.7
Ohio-----	2,063,607	1,857,247	---	19,716,389	17,716,405	10.4	41,335,493	36,447,089	280.7	75,112,119	67,402,771	3.4
Oklahoma-----	14,164,200	12,835,980	18.2	16,059,770	14,406,417	36.7	44,810,710	40,188,314	62.3	23,164,235	20,645,797	81.8
Oregon-----	11,579,555	10,430,100	14.9	10,973,124	9,709,118	21.3	402,633,924	92,211,878	135.3	65,871,522	58,860,494	138.7
Pennsylvania-----	107,449,557	96,418,101	66.0	66,472,770	59,721,185	53.9	215,909,875	192,598,458	133.0	80,255,820	72,055,646	58.8
Rhode Island-----	1,239,100	1,115,190	---	6,646,686	5,927,661	1.2	58,932,118	49,924,867	5.4	1,576,730	1,401,921	1.9
South Carolina-----	9,839,506	8,992,805	4.6	9,565,286	8,732,518	21.4	49,141,915	43,723,593	115.6	14,463,103	13,013,235	40.5
South Dakota-----	15,666,000	14,266,091	74.6	2,609,336	2,375,534	9.7	22,796,678	20,760,862	55.5	29,608,200	26,949,939	79.6
Tennessee-----	22,327,967	20,095,171	32.1	22,173,718	19,956,341	63.8	235,211,105	208,834,429	210.3	66,129,980	59,511,912	155.3
Texas-----	34,801,700	31,062,780	66.6	17,138,500	15,427,200	36.2	267,000,052	239,318,535	323.5	114,060,255	101,839,755	159.7
Utah-----	28,894,277	27,265,001	51.4	39,229,701	37,540,086	63.2	50,559,285	47,805,219	9.3	13,216,291	12,447,364	34.3
Vermont-----	4,151,309	3,736,178	---	---	---	---	38,262,694	34,361,177	51.9	20,285,897	18,131,449	23.4
Virginia-----	45,228,559	40,983,348	25.7	23,852,222	21,585,091	20.0	351,637,251	315,912,751	318.4	53,227,529	47,536,640	89.2
Washington-----	3,716,860	3,406,845	7.7	27,714,389	25,122,987	21.9	132,744,333	118,706,612	77.4	44,614,713	37,377,558	46.6
West Virginia-----	20,627,479	18,564,731	4.5	24,469,742	22,022,768	14.3	65,639,286	58,056,252	25.5	13,478,867	12,043,947	30.7
Wisconsin-----	6,026,869	4,743,481	8	5,318,526	4,793,905	13.4	82,040,486	72,261,143	83.7	28,127,331	25,366,299	74.9
Wyoming-----	7,921,208	7,359,655	21.5	9,198,510	8,523,408	59.5	43,179,186	40,102,807	153.8	26,582,845	24,733,609	178.2
Dist. of Columbia-----	9,461,502	8,572,232	7	11,341,419	10,186,293	1.1	80,807,711	77,306,980	5.3	1,266,840	921,156	---
Puerto Rico-----	---	---	---	---	---	---	---	---	---	---	---	---
Total-----	1,116,606,998	915,797,906	1,356.0	1,053,498,929	942,046,844	1,476.7	7,024,235,458	6,239,287,157	5,567.1	1,799,561,016	1,600,048,367	2,738.2

¹ Includes projects financed from Federal-aid primary, secondary, urban, and Interstate funds. Columns may not add to totals due to rounding.

² Initial commitment of funds.

Table 13.—Status of improvements of the Federal-aid primary system in rural areas as of June 30, 1963, financed with Federal-aid funds,¹ including projects completed during the fiscal year

State or Territory	Programed, ² plans not approved			Plans approved, not under construction			Under construction			Completed during fiscal year		
	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles
Alabama.....	\$85,134,142	\$28,593,026	62.2	\$26,924,233	\$20,318,223	173.1	\$78,513,875	\$62,840,931	138.4	\$27,884,193	\$22,046,741	123.6
Alaska.....	30,108,945	19,043,373	101.4	6,176,686	5,834,602	32.6	46,989,710	42,042,423	216.3	8,542,135	8,210,790	46.5
Arizona.....	31,249,845	29,253,923	86.6	14,417,141	13,308,204	24.5	75,982,876	70,714,086	196.0	24,021,617	21,113,699	118.3
Arkansas.....	43,631,843	38,086,816	108.7	41,608,078	32,301,409	192.2	81,904,412	64,153,526	302.3	14,372,283	9,136,998	98.1
California.....	46,247,628	22,002,098	14.3	60,808,742	42,375,978	101.7	270,844,842	211,000,979	215.6	65,460,886	47,720,910	56.0
Colorado.....	25,822,487	21,096,266	88.8	1,411,989	801,661	12.2	34,318,312	28,816,131	141.8	29,977,956	21,744,373	196.8
Connecticut.....	609,575	548,618	—	8,928,635	5,273,781	4.7	39,928,461	33,166,096	17.4	2,763,775	1,879,729	2.0
Delaware.....	5,045,391	4,188,852	4.9	6,954,000	4,464,200	13.9	33,547,883	27,052,137	13.2	722,388	434,560	—
Florida.....	15,628,112	10,834,801	52.1	18,581,736	13,436,359	73.3	90,165,778	70,083,033	319.4	35,362,087	25,986,790	184.7
Georgia.....	35,040,036	29,245,179	93.1	23,252,942	19,397,200	53.7	177,043,278	143,437,164	353.5	27,070,002	17,972,712	116.1
Hawaii.....	3,124,000	2,210,000	2.9	—	—	—	8,991,505	5,513,071	10.7	544,940	240,785	1.3
Idaho.....	22,244,544	20,190,681	68.6	4,683,901	4,039,384	38.5	55,487,596	46,928,922	330.3	3,038,920	2,733,414	13.3
Illinois.....	15,018,419	12,933,572	3.9	52,434,991	40,434,391	127.4	214,168,793	178,513,743	274.1	73,362,192	53,400,303	188.6
Indiana.....	27,219,220	23,786,034	31.4	29,898,520	23,324,165	143.0	126,372,497	102,954,682	236.7	65,854,408	47,102,689	290.8
Iowa.....	7,232,192	5,700,928	47.8	16,119,382	10,802,075	112.4	64,028,835	46,643,049	474.5	30,096,313	22,850,809	245.8
Kansas.....	13,381,780	11,583,030	62.2	16,796,637	11,591,394	131.5	34,967,536	24,915,035	279.5	29,269,689	18,200,152	353.8
Kentucky.....	15,714,666	13,623,911	39.2	23,958,432	18,818,866	69.3	100,086,345	79,994,986	136.9	50,709,327	37,186,806	121.4
Louisiana.....	321,000	284,500	—	11,793,140	10,138,680	24.8	160,496,089	130,707,893	238.7	39,237,712	31,268,079	113.8
Maine.....	6,698,944	4,077,064	42.6	12,812,657	11,464,160	30.8	31,493,139	25,391,310	69.3	16,131,010	11,216,961	44.2
Maryland.....	51,818,473	43,998,724	29.8	2,606,231	1,292,057	7.3	27,067,924	19,698,709	36.5	5,480,179	3,153,191	15.7
Massachusetts.....	15,885,392	13,890,032	3.4	36,225,670	31,752,994	34.1	69,402,557	53,915,834	47.2	30,406,086	24,191,182	24.3
Michigan.....	18,989,355	14,185,398	63.4	8,852,062	4,653,105	53.6	156,540,837	127,594,872	353.0	104,400,638	83,059,327	332.4
Minnesota.....	9,319,630	8,407,987	12.7	19,461,686	14,986,062	153.4	79,304,100	60,624,788	383.9	28,747,598	19,257,983	317.9
Mississippi.....	49,834,144	42,955,897	201.2	10,426,768	8,835,371	44.7	76,418,845	61,480,059	318.2	39,992,966	30,515,852	276.6
Missouri.....	3,705,190	3,041,979	4.3	30,179,768	24,961,518	75.4	136,165,121	103,566,652	291.5	63,826,725	47,949,891	173.7
Montana.....	27,423,475	22,918,924	129.1	7,490,305	5,706,984	87.6	111,558,176	95,985,252	477.9	13,161,588	9,376,432	102.5
Nebraska.....	21,871,965	18,761,110	72.6	22,838,724	17,707,438	192.2	50,282,051	39,510,416	277.6	26,176,285	18,718,814	214.5
Nevada.....	15,475,000	14,810,627	28.0	7,947,381	7,560,848	34.2	39,457,402	37,083,424	100.7	18,102,128	16,611,680	118.7
New Hampshire.....	5,116,332	4,265,859	8.7	8,044,690	5,758,295	12.6	31,867,325	26,349,784	37.8	15,281,771	12,284,790	19.7
New Jersey.....	27,482,556	21,493,242	21.7	1,780,500	890,230	2.1	87,023,091	72,903,058	333.6	16,841,083	10,607,267	27.7
New Mexico.....	17,514,459	13,709,848	46.8	6,555,853	6,112,554	28.3	39,762,615	35,534,003	117.9	16,829,199	13,174,659	122.0
New York.....	6,712,600	3,843,680	4.1	24,225,872	17,794,040	28.1	166,456,050	108,024,731	280.2	49,014,881	27,706,480	148.5

North Carolina.....	20,648,279	14,761,207	50.5	5,248,570	3,644,265	22.7	88,447,062	67,495,501	203.9	36,284,149	22,981,005	206.5
North Dakota.....	8,750,100	7,987,890	47.0	4,601,313	3,897,526	32.9	36,737,026	26,913,845	464.1	10,777,872	8,337,956	100.6
Ohio.....	3,217,912	2,402,771	4.7	9,693,894	7,729,235	18.3	334,678,275	266,024,037	408.4	36,368,389	32,171,262	6.1
Oklahoma.....	16,677,200	14,125,530	43.8	23,202,071	16,373,752	90.0	44,796,459	31,536,002	109.4	40,070,378	27,677,765	266.2
Oregon.....	7,290,155	6,476,300	14.0	22,064,175	9,831,120	30.1	55,316,725	45,126,369	157.4	54,537,415	44,006,353	182.7
Pennsylvania.....	81,882,537	70,702,671	64.3	64,720,586	50,775,417	77.7	295,345,704	158,764,901	221.4	94,468,553	60,486,824	113.7
Rhode Island.....	280,100	212,000	---	475,070	406,413	6.6	7,696,234	4,516,201	3.3	5,975,192	3,067,404	19.5
South Carolina.....	9,782,124	6,813,614	37.2	10,848,750	8,231,635	113.4	48,186,952	37,135,927	191.8	27,831,301	19,485,178	162.7
South Dakota.....	27,564,000	20,842,968	348.4	6,735,458	4,655,322	95.7	29,785,140	24,195,654	215.8	34,131,933	28,322,200	238.9
Tennessee.....	14,807,762	12,408,995	53.4	21,991,710	18,329,934	86.6	147,821,533	118,782,982	292.7	57,840,189	46,194,857	203.5
Texas.....	21,734,500	16,502,280	142.5	20,709,558	14,999,450	156.6	148,554,706	114,664,800	651.6	74,908,190	52,012,140	510.2
Utah.....	28,597,866	26,886,807	55.6	15,395,234	13,916,669	51.2	31,708,708	29,062,001	61.4	18,427,666	15,669,110	109.9
Vermont.....	4,690,684	4,005,866	---	---	---	---	39,835,568	34,414,835	60.9	19,110,288	14,420,238	34.0
Virginia.....	31,419,230	27,245,565	35.9	18,514,581	15,199,059	30.2	301,097,197	258,889,032	382.4	66,581,205	53,398,473	162.4
Washington.....	5,816,742	4,530,915	8.0	12,917,917	5,999,034	32.2	65,469,825	50,513,991	146.8	29,079,661	17,351,158	100.7
West Virginia.....	18,702,680	13,630,203	10.0	14,732,942	13,163,168	17.2	62,545,392	49,684,990	41.6	15,242,217	12,928,652	41.2
Wisconsin.....	1,835,715	971,443	8	8,743,509	6,117,309	72.2	49,941,118	39,826,517	180.3	41,548,785	28,604,525	268.7
Wyoming.....	8,965,862	8,004,195	30.6	10,347,876	9,289,343	69.8	49,110,782	43,105,082	201.3	32,048,840	28,203,725	222.2
Dist. of Columbia.....	---	---	---	---	---	---	---	---	---	---	---	---
Puerto Rico.....	23,646	6,220	---	130,262	34,411	---	8,193,807	4,048,953	17.2	5,885,220	2,886,941	13.5
Total.....	953,278,762	784,113,208	2,483.2	835,265,258	638,759,329	3,104.6	4,552,410,819	3,042,402,513	10,782.3	1,674,451,404	1,244,901,989	7,202.4

² Initial commitment of funds.

¹ Includes projects on rural portions of the Federal-aid primary highway system financed from Federal-aid primary, secondary, and Interstate funds. Columns may not add to totals due to rounding.

Table 14.—Status of improvements on secondary roads in rural areas as of June 30, 1963, financed with Federal-aid funds,¹ including projects completed during the fiscal year

State or Territory	Programed, 2 plans not approved			Plans approved, not under construction			Under construction			Completed during fiscal year		
	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles
Alabama.....	---	---	---	---	---	---	\$24,836,173	\$11,893,448	701.9	\$10,016,309	\$4,677,567	362.7
Alaska.....	\$16,283,955	\$15,421,390	144.3	\$9,000	\$4,500	---	30,020,853	26,776,917	126.0	8,212,397	7,757,704	53.6
Arizona.....	---	---	---	5,525,435	5,146,648	25.3	6,095,194	5,170,790	53.6	9,961,347	7,058,109	153.4
Arkansas.....	---	---	---	---	---	---	22,977,583	11,559,164	436.8	13,886,025	6,684,561	393.8
California.....	246,853	150,206	---	---	---	---	22,147,431	12,515,158	175.9	16,875,164	9,466,386	196.4
Colorado.....	121,246	69,098	---	---	---	---	7,038,853	4,020,806	127.3	6,555,150	3,907,737	149.7
Connecticut.....	---	---	---	---	---	---	4,526,910	2,313,722	15.9	266,435	128,998	.3
Delaware.....	---	---	---	---	---	---	4,090,550	2,948,625	17.1	757,040	370,870	10.8
Florida.....	---	---	---	---	---	---	13,661,436	6,837,894	219.7	15,340,463	7,172,053	239.8
Georgia.....	10,000	9,000	---	393,698	196,849	3.3	32,563,216	16,514,907	620.7	19,625,211	9,301,607	326.7
Hawaii.....	4,084,200	2,042,100	8.8	2,482,800	1,238,250	5.4	1,616,702	767,746	.1	256,868	128,434	---
Idaho.....	8,000	7,200	---	1,058,895	676,961	25.9	7,637,904	4,876,262	131.6	6,292,197	4,113,274	138.2
Illinois.....	95,550	47,775	.8	---	---	---	42,948,618	21,406,927	631.6	20,852,435	10,212,854	397.8
Indiana.....	13,093,670	6,568,585	68.6	4,757,330	2,378,665	63.7	13,111,523	6,816,274	80.6	7,595,062	3,799,451	94.4
Iowa.....	---	---	---	---	---	---	17,221,777	8,749,806	630.2	17,315,174	8,687,421	711.9
Kansas.....	---	---	---	2,200	1,100	---	17,055,113	8,612,348	803.0	11,508,583	5,767,385	682.8
Kentucky.....	---	---	---	---	---	---	24,651,828	11,754,465	158.5	12,484,144	6,255,580	148.5
Louisiana.....	---	---	---	---	---	---	25,729,308	12,327,973	215.0	5,031,937	2,475,635	84.9
Maine.....	381,252	190,626	3.2	---	---	---	8,146,733	4,070,630	75.1	4,705,681	1,854,712	33.3
Maryland.....	290,342	145,171	6.6	---	---	---	5,869,490	2,910,358	114.2	1,460,966	723,332	58.2
Massachusetts.....	220,000	110,000	1.9	180,000	90,000	1.0	4,650,211	2,317,619	17.5	4,085,729	1,993,354	14.5
Michigan.....	---	---	---	100,000	50,000	.8	30,403,771	15,428,006	795.3	15,640,308	7,831,492	637.8
Minnesota.....	40,000	20,000	---	---	---	---	21,412,549	10,353,669	948.8	8,289,575	3,995,514	628.9
Mississippi.....	12,250	6,125	---	---	---	---	26,320,735	11,931,583	820.9	13,156,632	6,015,430	384.4
Missouri.....	1,451,134	725,567	45.7	172,568	86,284	8.3	16,119,890	8,134,517	409.6	19,830,617	9,970,604	1,138.6
Montana.....	9,500	8,550	---	---	---	---	22,714,347	13,700,033	393.5	8,572,522	4,884,121	125.8
Nebraska.....	88,230	53,315	.7	---	---	---	18,394,116	9,342,235	696.5	17,302,451	8,692,863	542.4
Nevada.....	---	---	---	---	---	---	9,820,131	8,822,805	141.5	2,022,644	1,815,829	37.8
New Hampshire.....	---	---	---	---	---	---	5,101,083	2,546,605	22.5	2,616,893	1,303,537	12.5
New Jersey.....	305,569	152,784	2.5	---	---	---	7,276,157	3,637,345	27.2	1,172,468	568,628	19.0
New Mexico.....	119,950	77,732	---	---	---	---	6,964,919	4,713,003	93.8	6,491,703	4,256,441	86.2
New York.....	---	---	---	236,000	118,000	.7	29,488,512	13,881,998	127.1	17,481,824	7,806,967	93.0

North Carolina.....	3, 841, 800	1, 420, 900	5. 8				32, 368, 845	15, 747, 839	228. 5	10, 181, 239	7, 992, 805	196. 7
North Dakota.....	102, 115	81, 057					14, 228, 710	7, 140, 698	870. 5	5, 737, 315	2, 875, 376	445. 4
Ohio.....	155, 844	77, 922	. 7	184, 200	92, 100	3. 9	22, 685, 248	12, 407, 323	123. 5	30, 402, 741	15, 710, 738	167. 2
Oklahoma.....							21, 184, 512	10, 722, 778	514. 5	13, 152, 771	6, 749, 307	385. 9
Oregon.....				46, 000	46, 000	10. 3	11, 721, 771	7, 217, 271	86. 1	4, 578, 298	2, 813, 123	100. 5
Pennsylvania.....	652, 292	326, 146	2. 7				40, 429, 031	20, 185, 533	186. 9	17, 286, 404	8, 620, 753	591. 6
Rhode Island.....							2, 495, 903	1, 250, 245	13. 4	1, 140, 803	570, 446	4. 3
South Carolina.....	586, 200	365, 100	31. 3				17, 980, 869	9, 150, 885	967. 1	9, 014, 728	4, 498, 724	473. 3
South Dakota.....	43, 000	23, 800	. 2				11, 931, 437	6, 686, 452	646. 5	5, 593, 164	3, 123, 201	294. 5
Tennessee.....							18, 244, 659	8, 864, 513	412. 3	14, 723, 687	7, 376, 087	487. 6
Texas.....							31, 352, 370	15, 926, 653	758. 2	31, 651, 722	15, 913, 000	765. 8
Utah.....	51, 547	39, 696					8, 411, 668	6, 319, 298	103. 4	4, 229, 148	3, 086, 472	66. 4
Vermont.....							5, 312, 324	2, 604, 148	33. 0	1, 713, 587	837, 465	12. 7
Virginia.....	86, 414	43, 206					16, 242, 837	9, 076, 859	147. 5	12, 819, 402	6, 153, 343	185. 4
Washington.....	50, 000	26, 700	2. 3	117, 505	63, 000	. 8	14, 128, 201	7, 430, 432	191. 0	7, 303, 498	3, 743, 299	162. 8
West Virginia.....	1, 734, 320	867, 160	4. 3				18, 909, 322	9, 394, 533	43. 7	5, 847, 990	3, 071, 159	22. 4
Wisconsin.....							20, 286, 233	10, 252, 388	360. 1	11, 640, 640	5, 670, 953	310. 5
Wyoming.....							8, 625, 456	5, 465, 931	127. 2	6, 978, 447	4, 031, 851	127. 0
Dist. of Columbia.....							11, 718, 833	5, 239, 617	44. 0	2, 586, 215	1, 208, 734	11. 9
Puerto Rico.....	26, 301	6, 918		141, 884	38, 274							
Total.....	44, 167, 534	29, 584, 209	330. 5	15, 410, 515	10, 226, 721	149. 4	859, 411, 841	457, 934, 538	15, 746. 5	508, 323, 873	264, 565, 823	12, 269. 2

¹ Includes projects on secondary roads in rural areas financed from Federal-aid secondary funds. Columns may not add to totals due to rounding.

² Initial commitment of funds.

Table 15.—Status of improvements in urban areas as of June 30, 1963, financed with Federal-aid funds,¹ including projects completed during the fiscal year

State or Territory	Programed, ² plans not approved				Plans approved, not under construction				Under construction				Completed during fiscal year			
	Total cost	Federal funds	Miles		Total cost	Federal funds	Miles		Total cost	Federal funds	Miles		Total cost	Federal funds	Miles	
Alabama.....	\$33,814, 786	\$21, 076, 366	4. 7	\$11, 097, 858	\$8, 118, 687	38. 5	\$73, 186, 421	\$58, 782, 561	22. 8	\$16, 523, 792	\$10, 518, 194	23. 2				
Alaska.....	317, 000	299, 537	. 6	729, 294	658, 898	1. 0	2, 877, 967	2, 604, 054	1. 4	906, 800	786, 569	-----				
Arizona.....	3, 037, 000	2, 547, 745	5. 3	1, 356, 659	1, 207, 141	2. 8	16, 162, 190	14, 835, 953	13. 7	8, 323, 947	6, 889, 447	17. 4				
Arkansas.....	1, 854, 100	1, 077, 050	3. 8	13, 422, 940	10, 597, 047	26. 6	23, 813, 084	19, 815, 940	10. 7	8, 738, 474	7, 007, 084	17. 0				
California.....	88, 905, 862	10, 487, 087	9. 9	43, 275, 888	35, 183, 799	24. 8	691, 022, 397	561, 959, 841	100. 6	191, 535, 105	151, 407, 603	84. 1				
Colorado.....	2, 111, 398	1, 205, 086	10. 9	1, 440, 941	812, 565	6. 8	33, 120, 211	23, 788, 414	17. 3	10, 763, 961	7, 802, 366	22. 7				
Connecticut.....	2, 995, 000	1, 604, 700	. 8	1, 549, 302	1, 350, 756	-----	138, 706, 642	110, 015, 509	13. 9	9, 586, 867	6, 817, 511	3. 2				
Delaware.....	4, 676, 842	3, 841, 158	2. 2	1, 930, 500	959, 000	5. 7	19, 121, 331	16, 391, 838	3. 6	574, 294	286, 228	. 3				
Florida.....	2, 956, 206	1, 846, 585	5. 2	6, 174, 180	4, 870, 665	1. 4	55, 158, 876	45, 994, 655	34. 9	20, 172, 937	16, 278, 620	20. 4				
Georgia.....	25, 654, 196	19, 326, 918	30. 9	24, 193, 828	19, 843, 210	25. 1	101, 760, 988	79, 787, 861	59. 7	32, 280, 719	25, 700, 870	37. 4				
Hawaii.....	-----	-----	-----	11, 277, 547	7, 113, 540	2. 7	7, 086, 156	5, 502, 689	. 3	5, 013, 853	3, 124, 802	-----				
Idaho.....	1, 551, 728	1, 283, 030	1. 9	1, 609, 037	1, 199, 039	5. 6	6, 708, 234	5, 406, 284	13. 2	2, 176, 278	1, 708, 497	-----				
Illinois.....	9, 972, 803	8, 165, 146	2. 3	43, 214, 220	33, 817, 700	27. 4	250, 754, 129	197, 430, 186	70. 8	125, 369, 827	97, 191, 531	43. 8				
Indiana.....	8, 912, 615	7, 608, 722	10. 4	8, 371, 065	6, 951, 677	6. 3	89, 738, 772	67, 906, 948	40. 5	28, 212, 142	20, 262, 107	20. 7				
Iowa.....	1, 885, 520	1, 311, 323	4. 0	6, 632, 534	5, 007, 953	5. 8	26, 216, 875	20, 005, 730	26. 0	6, 820, 685	4, 663, 014	15. 2				
Kansas.....	6, 148, 380	5, 027, 394	12. 9	3, 763, 894	3, 093, 699	4. 3	29, 332, 399	24, 750, 473	9. 4	6, 295, 437	4, 389, 241	8. 0				
Kentucky.....	4, 151, 712	3, 470, 197	-----	1, 634, 193	852, 531	3. 3	59, 594, 901	47, 496, 135	18. 7	17, 091, 655	11, 637, 391	16. 8				
Louisiana.....	258, 200	233, 280	-----	9, 324, 150	7, 340, 150	4. 5	161, 925, 698	135, 589, 134	46. 0	42, 682, 557	34, 832, 414	33. 2				
Maine.....	869, 824	434, 912	1. 0	96, 700	44, 350	. 5	3, 989, 608	2, 541, 562	5. 3	4, 692, 984	3, 672, 071	3. 5				
Maryland.....	7, 071, 019	3, 866, 571	9. 7	10, 004, 327	6, 546, 298	10. 5	105, 475, 934	85, 243, 409	49. 9	45, 773, 072	36, 885, 154	36. 7				
Massachusetts.....	22, 008, 170	19, 212, 114	2. 7	40, 831, 371	33, 347, 758	26. 6	135, 435, 786	101, 047, 599	50. 7	51, 105, 532	32, 579, 123	31. 7				
Michigan.....	242, 342	164, 663	-----	5, 717, 147	2, 934, 487	2. 3	159, 597, 942	116, 706, 843	93. 5	34, 920, 679	22, 728, 355	13. 9				
Minnesota.....	25, 288, 303	22, 932, 107	6. 6	29, 338, 398	24, 639, 394	18. 5	194, 456, 073	164, 892, 957	47. 0	22, 865, 565	16, 041, 936	22. 5				
Mississippi.....	3, 243, 200	2, 051, 710	6. 2	5, 252, 796	2, 928, 205	7. 6	16, 875, 691	12, 367, 359	9. 0	7, 412, 554	5, 643, 049	24. 9				
Missouri.....	6, 055, 056	5, 048, 703	3. 0	30, 429, 915	24, 760, 075	20. 4	105, 834, 851	80, 270, 590	34. 1	25, 029, 662	20, 362, 568	13. 4				
Montana.....	228, 280	145, 740	-----	728, 285	618, 811	1. 0	15, 316, 453	12, 602, 314	14. 6	5, 514, 643	4, 304, 049	11. 2				
Nebraska.....	2, 326, 745	1, 631, 057	1. 4	2, 769, 790	1, 464, 911	1. 5	26, 706, 902	22, 563, 179	5. 9	10, 226, 707	8, 069, 014	6. 2				
Nevada.....	225, 000	202, 018	. 5	-----	-----	-----	27, 983, 860	26, 360, 067	1. 3	300, 971	251, 721	. 1				
New Hampshire.....	975, 000	511, 900	2. 6	476, 059	238, 029	1. 3	1, 654, 075	1, 191, 953	. 9	3, 169, 614	2, 388, 599	1. 4				
New Jersey.....	20, 156, 280	12, 638, 372	11. 7	26, 245, 980	18, 309, 980	7. 4	228, 989, 381	175, 741, 292	46. 4	56, 600, 832	43, 584, 231	28. 3				
New Mexico.....	10, 224, 736	9, 132, 782	5. 2	478, 651	306, 995	2. 3	21, 131, 906	18, 747, 945	9. 2	9, 215, 011	7, 472, 522	11. 1				
New York.....	3, 110, 920	1, 496, 750	2. 7	164, 390, 292	125, 266, 275	29. 9	642, 406, 011	479, 501, 632	151. 5	82, 302, 417	43, 732, 680	50. 6				

North Carolina.....	7, 772, 032	4, 125, 378	8. 0	1, 927, 780	935, 095	6. 5	22, 034, 265	12, 406, 539	34. 2	9, 191, 346	5, 108, 857	14. 6
North Dakota.....	462, 000	250, 300	1. 5	767, 890	503, 237	. 6	5, 051, 388	3, 409, 977	6. 9	180, 763	90, 382	. 3
Ohio.....	1, 722, 103	956, 131	. 4	14, 870, 485	12, 386, 245	3. 6	248, 121, 647	190, 928, 641	103. 6	50, 476, 885	41, 283, 035	8. 9
Oklahoma.....	2, 259, 900	954, 050	7. 5	12, 456, 770	7, 753, 795	24. 8	30, 789, 099	23, 943, 780	28. 7	6, 306, 550	4, 520, 654	11. 4
Oregon.....	4, 467, 000	4, 004, 800	1. 2	829, 946	751, 400	. 1	78, 427, 594	62, 096, 518	29. 1	29, 230, 798	25, 671, 383	8. 9
Pennsylvania.....	63, 182, 558	44, 392, 449	26. 4	27, 001, 145	21, 542, 240	14. 9	162, 358, 842	108, 884, 278	65. 9	44, 047, 256	31, 562, 250	22. 1
Rhode Island.....	1, 986, 600	1, 416, 900	---	7, 906, 516	6, 388, 698	. 8	72, 955, 506	57, 181, 141	11. 3	3, 400, 458	2, 213, 029	4. 6
South Carolina.....	7, 894, 360	6, 119, 031	5. 1	6, 923, 708	4, 671, 418	6. 7	22, 000, 133	17, 577, 409	41. 2	9, 369, 441	5, 033, 327	20. 3
South Dakota.....	10, 691, 427	9, 301, 787	---	8, 174, 775	6, 033, 152	9. 3	2, 787, 887	1, 973, 309	3. 6	4, 093, 967	3, 316, 524	5. 7
Tennessee.....	23, 362, 400	20, 263, 900	19. 1	11, 193, 612	7, 955, 250	14. 3	149, 235, 908	120, 827, 363	35. 3	28, 184, 483	22, 857, 141	28. 2
Texas.....	2, 941, 549	2, 624, 174	1. 5	30, 076, 805	28, 532, 446	35. 8	27, 631, 382	179, 368, 482	140. 1	103, 388, 529	84, 014, 915	97. 9
Utah.....	---	---	---	---	---	---	---	25, 563, 307	3. 0	5, 097, 029	4, 684, 113	3. 8
Vermont.....	213, 075	105, 538	---	---	---	---	3, 464, 470	2, 455, 651	7. 2	7, 855, 086	7, 042, 257	8. 5
Virginia.....	24, 235, 336	18, 970, 440	7. 8	14, 053, 752	10, 538, 593	10. 4	93, 416, 318	78, 671, 915	18. 6	10, 695, 083	6, 085, 182	15. 8
Washington.....	2, 444, 850	1, 262, 490	2. 1	22, 199, 784	19, 883, 441	6. 4	113, 408, 505	91, 430, 185	38. 2	32, 539, 792	28, 053, 158	17. 0
West Virginia.....	13, 507, 064	10, 893, 659	3. 4	10, 011, 549	8, 996, 975	. 5	33, 479, 289	23, 540, 645	11. 6	4, 283, 318	2, 141, 673	4. 1
Wisconsin.....	4, 649, 154	4, 184, 238	---	2, 250, 828	1, 459, 196	5. 0	78, 899, 920	55, 394, 954	24. 3	21, 261, 277	14, 560, 555	13. 0
Wyoming.....	236, 038	205, 781	---	34, 480	22, 977	---	4, 452, 364	3, 818, 831	6. 6	1, 473, 676	1, 335, 126	2. 4
Dist. of Columbia.....	12, 204, 366	9, 956, 514	2. 7	20, 611, 944	14, 704, 741	4. 0	117, 895, 541	92, 975, 192	17. 1	5, 384, 670	3, 100, 109	1. 6
Puerto Rico.....	2, 420, 413	1, 163, 370	. 5	112, 454	29, 707	---	16, 755, 523	8, 002, 827	9. 2	4, 724, 109	2, 099, 267	3. 6
Total.....	487, 881, 088	310, 976, 652	246. 3	699, 761, 894	543, 472, 443	465. 9	4, 977, 996, 453	3, 809, 043, 507	1, 658. 4	1, 272, 384, 077	953, 834, 555	911. 7

¹ Includes projects in urban areas financed from Federal-aid primary, secondary, urban, and Interstate funds. Columns may not add to totals due to rounding.

² Initial commitment of funds.

Table 16.—Mileage of designated Federal-aid highway systems, by State, as of December 31, 1962

State or Territory	National System of Interstate and Defense Highways (Included with primary mileage)			Federal-aid primary highway system (Includes Interstate mileage)			Federal-aid secondary highway system			Grand total		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Alabama.....	781	94	875	5,770	730	6,500	23,249	484	23,913	23,199	1,214	30,413
Alaska.....	1,119	42	1,161	13,345	23	3,368	3,221	8	3,229	16,566	31	6,597
Arizona.....	1,477	41	518	2,696	120	2,816	3,810	332	4,142	6,506	452	6,958
Arkansas.....				3,770	272	4,042	13,330	210	13,540	17,100	482	17,582
California.....	1,625	554	2,179	8,113	1,592	9,705	11,086	1,074	12,160	19,199	2,666	21,865
Colorado.....	882	96	978	4,149	415	4,564	3,958	57	4,015	8,107	8,579	8,579
Connecticut.....	166	128	294	4,878	395	5,273	1,230	204	1,434	1,904	599	2,503
Delaware.....	36	4	40	488	164	652	1,337	120	1,457	1,825	284	2,109
Florida.....	1,030	106	1,136	4,773	635	5,408	13,515	527	14,042	18,288	1,162	19,450
Georgia.....	958	146	1,104	8,112	795	8,907	19,324	430	19,754	27,436	1,225	30,661
Hawaii.....	38	11	49	470	41	511	651	11	662	1,121	62	1,173
Idaho.....	536	19	612	3,234	87	3,321	5,411	49	5,460	8,645	136	8,781
Illinois.....	1,357	231	1,588	9,716	1,267	10,983	13,843	302	14,145	23,559	1,569	25,128
Indiana.....	982	139	1,121	5,216	791	6,007	17,726	270	17,996	22,942	1,061	24,003
Iowa.....	656	53	709	9,643	561	10,204	32,577	221	33,098	42,320	782	43,302
Kansas.....	687	114	801	7,347	475	7,822	23,725	171	23,896	31,972	646	31,718
Kentucky.....	644	60	704	4,547	366	4,913	15,048	205	15,253	19,229	571	19,800
Louisiana.....	590	93	683	2,920	405	3,325	8,829	189	9,018	11,560	594	12,154
Maine.....	292	20	312	1,781	145	1,926	2,241	61	2,302	4,022	206	4,228
Maryland.....	211	143	354	1,848	569	2,417	6,719	553	7,272	8,567	1,122	9,689
Massachusetts.....	267	131	448	1,622	836	2,358	1,683	577	2,260	3,205	1,413	4,618
Michigan.....	918	161	1,079	6,318	755	7,073	25,548	504	26,052	31,886	1,269	33,125
Minnesota.....	765	133	898	7,089	806	7,895	30,372	362	30,734	38,061	1,168	39,229
Mississippi.....	615	63	678	5,555	294	5,849	16,135	246	16,381	21,690	540	22,230
Missouri.....	980	125	1,105	8,322	582	8,904	22,977	178	23,155	31,299	760	32,059
Montana.....	1,164	17	1,181	6,381	106	6,487	5,468	21	5,489	11,849	127	11,976
Nebraska.....	481	9	490	5,696	172	5,868	17,743	231	17,974	23,391	220	23,611
Nevada.....	524	10	534	2,155	42	2,197	2,898	32	2,930	5,053	74	5,127
New Hampshire.....	196	18	214	1,121	117	1,238	1,622	54	1,676	2,743	171	2,914
New Jersey.....	208	168	376	1,332	835	2,167	1,605	567	2,172	2,937	1,402	4,339
New Mexico.....	974	33	1,007	3,813	216	4,029	5,530	83	5,613	9,343	299	9,642
New York.....	804	423	1,227	8,374	2,283	10,657	17,619	1,738	19,357	25,993	4,021	30,014

North Carolina.....	715	54	769	4,240	443	4,683	28,020	630	29,250	32,860	1,073	33,933
North Dakota.....	557	11	568	4,578	54	4,632	13,051	18	13,069	17,029	72	17,701
Ohio.....	1,289	229	1,518	6,665	1,382	8,047	10,960	1,151	18,111	23,025	2,533	26,158
Oklahoma.....	685	109	794	7,691	655	8,346	12,769	496	13,265	20,460	1,151	21,611
Oregon.....	677	55	732	3,861	256	4,117	7,807	114	7,981	11,728	370	12,098
Pennsylvania.....	1,304	271	1,575	7,062	1,431	8,493	12,204	1,221	13,425	19,266	2,632	21,918
Rhode Island.....	33	38	71	272	236	508	323	139	482	595	335	990
South Carolina.....	602	17	679	4,871	401	5,272	18,083	227	18,310	22,954	628	23,582
South Dakota.....	670	9	679	5,960	90	6,050	12,549	23	12,572	18,509	113	18,622
Tennessee.....	926	122	1,048	6,293	541	6,834	10,855	242	11,097	17,148	753	17,931
Texas.....	2,482	550	3,032	15,471	2,005	17,476	33,043	727	34,370	49,114	2,732	51,846
Utah.....	890	45	935	2,214	134	2,348	3,705	123	3,828	5,919	257	6,176
Vermont.....	312	12	324	1,534	95	1,629	1,811	21	1,832	3,345	116	3,461
Virginia.....	952	101	1,053	5,094	538	5,632	18,426	222	18,648	23,520	760	24,280
Washington.....	596	130	726	3,614	356	3,970	11,056	360	11,416	14,970	716	15,386
West Virginia.....	495	37	532	2,081	231	2,312	10,646	102	10,748	13,327	333	13,660
Wisconsin.....	425	28	453	5,839	516	6,355	18,137	870	19,007	23,976	1,386	25,362
Wyoming.....	895	22	917	3,791	71	3,862	2,575	13	2,588	6,366	84	6,450
District of Columbia.....	---	29	29	---	167	167	---	121	121	---	288	288
Puerto Rico.....	---	---	---	394	142	536	1,063	49	1,112	1,457	191	1,648
Total.....	35,555	5,304	240,859	238,853	26,636	265,489	604,412	16,777	621,189	843,265	43,413	886,678

¹ Alaska includes 671 miles of ferry routes.

² The 141-mile difference between the full authorization of 41,000 miles and the 40,859 miles reported here includes routes for which the final locations have not yet been determined.

Table 17.—Status of national forest highway projects as of June 30, 1963, and projects completed during the fiscal year¹

State or Territory	Programed, ² construction not yet authorized			Construction authorized, not started			Under construction			Completed during fiscal year		
	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles	Total cost	Federal funds	Miles
Alabama.....				\$121,800	\$111,787	6.5	\$105,800	\$105,800	3.6	\$3,877,215	\$3,877,215	27.2
Alaska.....	\$1,622,000	\$1,622,000	9.6				7,560,588	7,560,588	33.6	2,183,708	2,183,708	51.5
Arizona.....	1,692,000	1,692,000	30.1				2,939,203	2,939,203	45.8	1,069,380	504,690	22.0
Arkansas.....				985,420	911,626	17.3	6,120	5,904				
California.....	3,800,000	3,800,000	24.6	1,946,844	1,946,844	30.6	8,517,891	8,517,891	51.0	2,797,654	2,797,654	27.6
Colorado.....	2,198,175	2,198,175	18.2	1,032,417	1,032,417	8.5	4,499,310	4,499,310	38.6	887,923	887,923	3.2
Connecticut.....												
Delaware.....												
Florida.....							1,843,516	758,700	21.6			
Georgia.....							444,161	444,161	4.0			
Hawaii.....												
Idaho.....	3,432,000	3,432,000	25.7	876,745	876,745	6.6	6,224,345	6,224,345	84.1	2,405,076	2,405,076	44.4
Illinois.....												
Indiana.....	45,580	22,790					333,400	160,814	2.9	63,606	31,803	.1
Iowa.....												
Kansas.....												
Kentucky.....	125,528	62,764	1.3				299,222	149,610	2.3	151,120	75,560	3.2
Louisiana.....							269,610	225,689	2.6			
Maine.....												
Maryland.....												
Massachusetts.....												
Michigan.....				190,260	144,980	11.0	1,208,900	951,950	17.8			
Minnesota.....				681,000	61,200		502,200	451,980	6.5	755,172	719,047	25.9
Mississippi.....				437,000	218,500	6.7	1,001,347	811,347	18.4			
Missouri.....				268,842	134,421	17.0				597,723	306,970	35.9
Montana.....	2,675,000	2,675,000	49.8	662,015	662,015	16.0	4,718,244	4,718,244	107.0	2,174,604	2,174,604	30.8
Nebraska.....				38,390	38,390	2.9						
Nevada.....	540,000	540,000	2.9	332,000	332,000	9.1	459,000	459,000	2.8	907,037	712,863	6.5
New Hampshire.....				156,376	156,376	2.3	44,307	44,307	.7	284,766	264,953	3.9
New Jersey.....	7,126	7,126										
New Mexico.....	850,000	850,000	6.5	330,254	330,254	2.1	2,365,890	2,365,890	25.5	1,193,746	1,193,746	23.2
New York.....												

North Carolina.....	800,000	400,000	10.5			578,010	289,005	10.0	312,580	156,280	4.5
North Dakota.....		31,052	1.1						57,397	57,397	1.4
Ohio.....				84,183	4.5				22,642	22,091	
Oklahoma.....						84,183					
Oregon.....	4,805,379	4,230,379	48.9	678,037	10.5	6,263,882	6,263,882	77.0	3,903,478	3,903,478	47.3
Pennsylvania.....						285,100	142,550	2.2	216,002	103,252	1.7
Rhode Island.....											
South Carolina.....				371,000	9.6	199,200	103,100	14.3	261,303	150,687	16.2
South Dakota.....	400,000	400,000	3.2			323,568	323,568	1.4	29,559	29,559	
Tennessee.....	457,969	228,984	2								
Texas.....	538,000	269,000	8.3						426,306	213,100	17.4
Utah.....	1,709,329	883,000	19.7	127,016	8.1	794,464	703,083	5.0	2,403,280	2,403,280	32.2
Vermont.....											
Virginia.....	401,000	401,000	10.6			109,167	107,107	1.1		3,336	
Washington.....	1,563,500	1,563,500	10.9	311,604	2.3	482,788	482,788	6.5	3,432	600,776	7.1
West Virginia.....	199,801	199,801	.6			5,088,224	5,088,224	43.3	596,222	591,860	10.6
Wisconsin.....				251,238	3.9	35,199	35,199				
Wyoming.....	1,350,000	1,000,000	10.2	600,183	4.5	1,601,095	1,601,095	15.9	322,445	322,445	6.3
District of Columbia.....									1,671,946	1,671,946	27.1
Puerto Rico.....				34,561	.3						
Total.....	29,243,439	26,508,571	295.1	9,904,185	180.4	59,063,741	56,534,337	645.5	30,251,338	28,590,476	478.2

¹ Includes construction projects only. Columns may not add to totals due to rounding.

² Initial commitment of funds.

Table 18.—Mileage of the national forest highway system, by forest road class and by State, as of June 30, 1963

Region and State or Territory	Total	Class 1 ¹	Class 2 ²	Class 3 ³
WEST:				
Alaska.....	566.5	139.6	254.5	172.4
Arizona.....	1,051.7	327.5	653.0	71.2
California.....	2,580.0	1,159.1	841.4	579.5
Colorado.....	1,476.6	568.9	537.5	370.2
Idaho.....	1,225.4	660.3	450.3	114.8
Montana.....	1,199.8	677.0	265.0	257.8
Nevada.....	369.5	154.7	190.3	24.5
New Mexico.....	644.1	131.2	443.2	69.7
Oregon.....	1,472.2	681.6	754.9	35.7
South Dakota.....	297.2	184.5	101.7	11.0
Utah.....	762.9	224.2	271.3	267.4
Washington.....	765.3	479.1	238.3	47.9
Wyoming.....	561.6	343.6	135.5	82.5
Total.....	12,972.8	5,731.3	5,136.9	2,104.6
EAST:				
Alabama.....	374.4	82.3	276.8	15.3
Arkansas.....	655.6	96.1	559.5	—
Florida.....	305.8	32.7	257.8	15.3
Georgia.....	380.4	168.5	186.2	25.7
Illinois.....	447.6	241.3	98.3	108.0
Indiana.....	101.2	53.6	47.6	—
Iowa.....	20.0	11.3	8.3	0.4
Kentucky.....	353.7	128.5	216.1	9.1
Louisiana.....	421.7	87.3	186.1	148.3
Maine.....	36.2	8.6	5.4	22.2
Michigan.....	1,260.0	590.8	651.4	17.8
Minnesota.....	704.0	259.6	417.6	26.8
Mississippi.....	578.9	323.9	255.0	—
Missouri.....	1,053.6	370.7	676.7	6.2
Nebraska.....	23.5	—	23.5	—
New Hampshire.....	159.3	61.9	41.0	56.4
North Carolina.....	844.9	217.6	580.7	46.6
Ohio.....	131.6	70.4	51.7	9.5
Oklahoma.....	81.8	45.1	36.7	—
Pennsylvania.....	353.9	118.4	85.9	149.6
South Carolina.....	776.7	221.5	488.0	67.2
Tennessee.....	570.0	169.2	344.4	56.4
Texas.....	383.3	128.3	226.7	28.3
Vermont.....	111.5	30.5	57.8	23.2
Virginia.....	1,418.0	378.4	930.2	109.4
West Virginia.....	494.3	78.3	375.2	40.8
Wisconsin.....	467.5	75.7	391.8	—
Puerto Rico.....	31.5	—	31.5	—
Total.....	12,540.9	4,050.5	7,507.9	982.5
Grand total.....	25,513.7	9,781.8	12,644.8	3,087.1

¹ Forest roads which are on the Federal-aid primary system.

² Forest roads which are on the Federal-aid secondary system

³ Other forest highways.

Table 19.—Highway construction in national battlefield sites, monuments, parks, and parkways, under direct supervision of the Bureau of Public Roads during fiscal year 1963

Battlefield site, monument, park, or parkway (and State)	Completed during fiscal year 1963		Under construction as of June 30, 1963	
	Miles	Estimated cost	Miles	Estimated cost
BATTLEFIELD SITE:				
Antietam (Md.).....			0.8	\$189,866
MONUMENTS:				
Arches (Utah).....			9.0	698,243
Badlands (S. Dak.).....			22.6	695,431
Cabrillo (Calif.).....			(1)	136,377
Capitol Reef (Utah).....	5.7	\$742,126		
Dinosaur (Utah-Colo.).....			15.2	1,660,664
PARKS:				
Acadia (Maine).....			5.2	548,172
Crater Lake (Oreg.).....	12.5	661,598	9.3	926,994
Glacier (Mont.).....	13.6	1,188,179	7.2	638,928
Grand Canyon (Ariz.).....	11.9	490,651	16.1	1,155,606
Grand Teton (Wyo.).....	.1	205,394	4.9	963,647
Great Smoky Mountains (N.C.-Tenn.).....			14.4	3,660,754
Hawaii (Hawaii).....			9.8	424,188
Lake Mead (Ariz.).....			8.8	418,751
Mammoth Cave (Ky.).....	16.6	1,380,808		
Mount McKinley (Alaska).....	12.8	491,131		
Mount Rainier (Wash.).....			9.0	427,304
Mount Rushmore (S. Dak.).....			(1)	151,570
National Capital (D.C.).....	.6	207,752		
Petersburg Military (Va.).....	1.1	228,733		
Rocky Mountain (Colo.).....			3.8	629,400
Shenandoah (Va.).....			(1)	60,887
Vicksburg Military (Miss.).....	3.8	255,344	3.4	254,480
Yellowstone (Wyo.).....	2.4	423,828	27.5	3,005,732
Yosemite (Calif.).....			7.6	1,072,713
PARKWAYS:				
Blue Ridge (Va.-N.C.).....	58.2	4,892,063	57.9	13,173,984
Colonial (Va.).....			.1	626,164
Foot hills (Tenn.).....	3.9	514,302	6.9	1,096,494
George Washington Memorial (Md.-Va.).....	2.4	1,337,868	7.2	4,535,444
Natchez Trace (Ala.-Miss.-Tenn.).....	37.6	4,360,978	56.8	8,469,600
Palisades (D.C.).....			(1)	63,948
Rock Creek and Potomac (D.C.).....			.7	1,739,084
Total.....	183.2	17,380,755	304.2	47,424,425

¹ Miscellaneous minor construction.

JUN 10 1967

